

Final Report

A Generic Expert Scheduling System Architecture and Toolkit: GUESS
(Generically Used Expert Scheduling System)

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by

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1.0 INTRODUCTION

1.1 Background

Scheduling is a prevalent function that is omnipresent throughout many industries and applications [1-4]. A great need exists for developing scheduling toolkits that can be generically applied to a number of different scheduling problems. To meet this need, more research is warranted for developing a state-of-the-art generic constraint problem-solver as related to scheduling.

Scheduling involves accomplishing a number of things that tie up various resources for a period of time. A scheduling problem can be defined as a set of constraints to satisfy. A solution to the scheduling problem is a set of compatible scheduling decisions that guarantee the satisfaction of the constraints [5]. Guaranteeing the compatibility of the decisions made is the role of constraint propagation. The order in which decisions must be made needs to be determined. In the NASA environment, scheduling is a critical area. According to the Engineering Services Group of McDonnell Douglas, in the next decade scheduling will be required for 365 days of the year and could take 2,000 to 3,000 people working continuously.

NASA has recognized a need for developing a generic scheduling toolkit. Toward this goal, NASA has developed such scheduling toolkits as PARR [6], AMP [7], Plan-It [8], and others [9]. Scheduling is a critical function for NASA Shuttle flights, payloads, and crew members or scheduling scientists to use the NASA-supported satellites. The development of a generic expert scheduling system could ultimately be applied to many NASA and other scheduling applications. To better meet this goal, the American Minority Engineering Corporation (AMEC), has through NASA support, developed a generic expert scheduling system architecture and toolkit known as GUESS (Generically Used Expert Scheduling System).

GUESS has been designed to take advantage of an object-oriented, hierarchical architecture. GUESS contains two major levels of schedulers. The low-level schedulers are composed of different scheduling methods, mainly heuristic-based and optimization/algorithmic-based. The high-level scheduler, called the metascheduler, coordinates the activation of the low-level schedulers and injects any new information that is pertinent to the scheduling problem.

GUESS is designed to aid the human scheduler and to keep him/her in the loop. GUESS is a decision support aid as opposed to an automated replacement for the human scheduler. GUESS is programmed in C++ and runs on an IBM PC Windows environment.

An object-oriented approach has been used for GUESS in order to maximize the reusability and corresponding generality of GUESS. As an example, GUESS can schedule 2,551 events and over 14,000 constraints in under 45 seconds on a Dell 486 computer. A library of scheduling test cases has been built with test cases ranging from manufacturing process scheduling, restaurant order scheduling, bus scheduling, to child care scheduling. In addition, James Martin Strategies, Inc. has been involved with GUESS in developing scheduling test cases in the airline, banking, manufacturing, telecommunications, and information technology industries.

1.2 Major Features of GUESS

1.2.1 Suggestion Tabulator (Sugtab)

The input file is first read. Depending on the technique chosen, the scheduling of the events takes place and the overall schedule is generated as output. Events are scheduled one at a time starting with an event of highest priority. To start, an event is scheduled by asking all of its constraints for their suggestions. A suggestion tabulator is given to an event, and the event passes it to each of the event's constraints. Each constraint can make zero or more suggestions to the suggestion tabulator, after which it can deduce the best beginning and ending times for the event based on the accumulated suggestions. The sugtab for an event is of four types: beginning range, ending range, beginning and ending equal suggestions. The range is controlled by greater and less than suggestions. Some constraints suggest a specific time for the beginning or end. An equal tabulator tabulates the equal condition suggestions and returns the value. The range tabulator tabulates the range by keeping a low and high limit.

1.2.2 Hill Climbing

This is another technique available for scheduling events in GUESS. The initial beginning time and satisfaction of the event is assumed to be the best and a non-linear search for better values is done on both sides of the initial value of time to search for better time and satisfaction. As the search transverses through either sides of the hill, the exponential increment for the time change can be adjusted for speed improvement. Similar to other techniques, the satisfaction of a particular event is calculated based on the satisfaction level of all its corresponding constraints. The higher the satisfaction level of an event, the happier it is in the schedule.

1.2.3 Genetic Algorithm

Genetic algorithms attempt to mimic the action of the “natural selection” process within living organisms to improve the characteristics of the species and to allow them to become better adapted to their environment. Genetic algorithms attempt to mimic this process within computationally difficult problems to arrive at some near optimum solution of the problem at hand. Genetic algorithms start with an initial population composed of some mixture of solutions that form the initial basis from which to begin a search for the best solution. This starter set of solutions is generally obtained in some arbitrary manner.

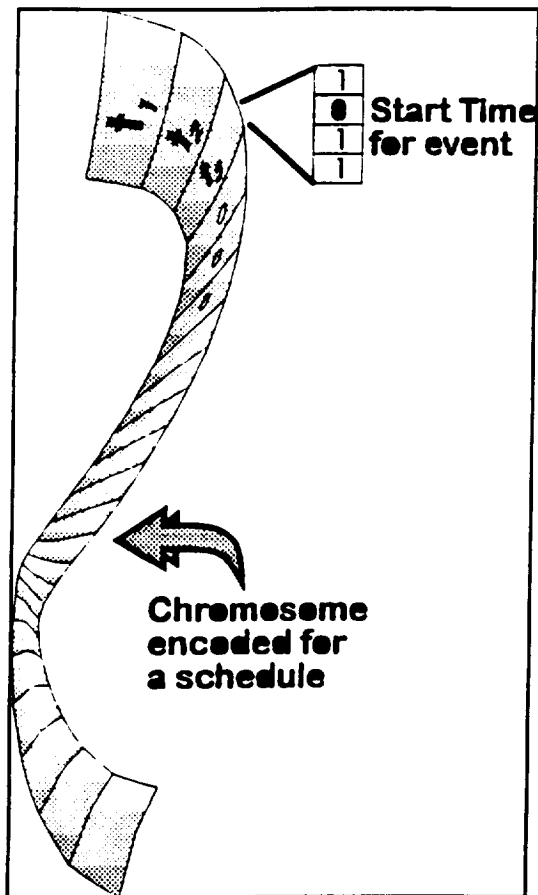
The algorithm then cross breeds this initial set of solutions combining the genes in the parent chromosomes to produce a child inheriting some characteristics from both parents. Random mutations are introduced during the breeding process to prevent the population from converging on some local maximum prematurely. Ranking of the solutions (chromosomes) is done using a fitness function which returns a positive number reflecting the relative value of the solutions. The higher the fitness number, the better the solution is. At each generation, the least fit solutions are removed from the gene pool. Eventually, we are left with a set of good solutions, from which the best solution is selected.

All of the specific domain knowledge required to implement the genetic algorithm is contained within the fitness function. This is an advantage over other AI techniques which require a large body of domain specific knowledge to be constructed. This information is time consuming to collect and limits the generality of the method.

Guess Implementation

Implementation of a genetic algorithm approach for *Guess* is done using the Evolutionary Object System (EOS) developed by Man Machine Interfaces, Inc. EOS is a C++ class library for creating genetic algorithms. The first decision that must be made is how to encode the schedule information as a chromosome. The standard encoding used in most classical genetic algorithm work is the binary encoding. Each gene within the chromosome is a series of bits. The genes are linked together to build a long chromosome (See Figure 1).

Figure 1 - Chromosome Encoding Scheme



EOS supports a variety of other possible encodings; however, the binary encoding is the most generic and was also recommended by the EOS vendor; so the decision was made to use the binary encoding in the implementation of a genetic algorithm within *Guess*. The only significant variable information associated with the schedule is the time at which each event is scheduled to occur. *Guess* assumes that the duration of an event is fixed and determined by the user at the time the event is entered; therefore, the only significant information that must be associated with the event is the starting time of the event. Each event has a specific gene within the chromosome. The gene occupies a series of bits of size *tTime* which is sufficient to record the starting time of an event.

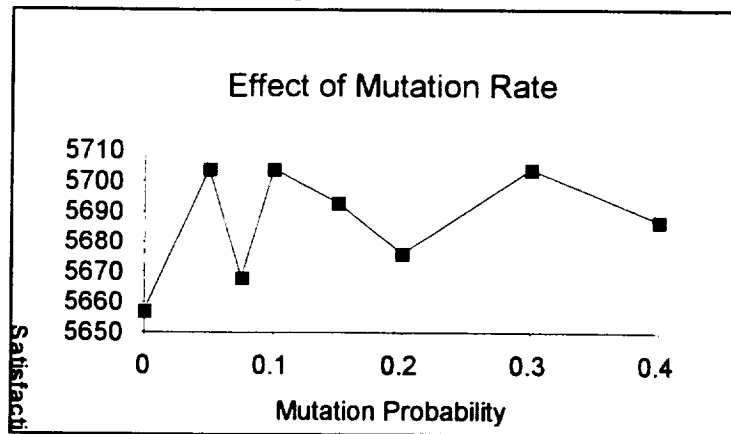
The standard seeder supplied with EOS creates the initial population in a random manner. This approach does not take advantage of any re-ordering that may have occurred previously and always starts from a clean slate. A new class (*TGuessSeeder*) was derived from the *TRandomSeeder* class. This class makes the first member of the population the original starting schedule and then

randomly populates the remainder of the chromosomes. A special class, *TSchedPheno* was derived from the abstract class *TPhenotype* to provide translation between the genotype (chromosome) and the expression of the genotype or phenotype. In the case of *Guess*, the expression of the genotype is the starting times of each event within the schedule.

TguessGA was derived from the *TBasicGA* class to allow some customization and statistics reporting on the genetic algorithm. This class maintains a copy of the best individual obtained so far as well as keeping track of the satisfaction scores and number of unscheduled events in each generation.

The calculation of fitness comprises the core of the genetic algorithm. The basis of calculating the fitness was chosen to be the satisfaction factor. A member variable that points to a genotype was added to the *cSchedule* class. The other basic change was in the calculation of the event times. Normally in *Guess*, the event times are extracted from internal member variables within the event object. This is not suited for processing the genetic algorithm, as the genetic algorithm requires evaluating the fitness of a large number of competing schedules for each generation. The *mBeg* member function was therefore modified to check the *cSchedule* and if a genotype was provided, the event starting time was extracted from the genotype rather than using its internal value. If no genotype is provided, then the event times are calculated in the usual manner.

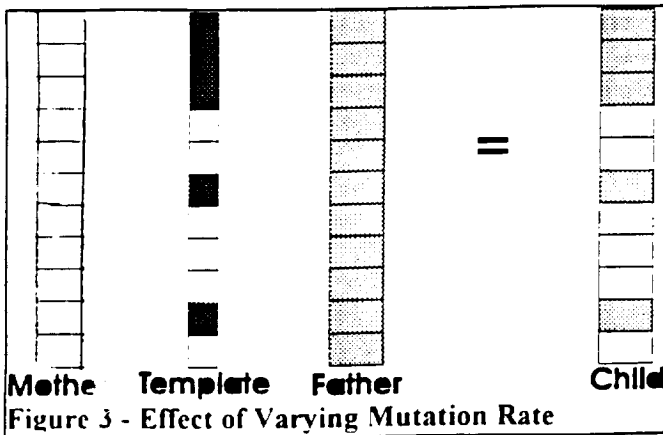
Figure 2



The *mEnd* and *mDuration* member functions were similarly modified to retrieve their times based upon the beginning time obtained from *mBeg*. This proved to be a rather elegant and efficient method of adapting the original *Guess* algorithms to work with a genetic algorithm with a minimal amount of change and without breaking any of the previously debugged and tested code.

The fitness function is based on using the schedule satisfaction normalized to a positive number. A division by the number of events that cannot be scheduled (due to resource conflicts) is done to impose a stiff penalty to resource constraint violations. Without the penalty, the genetic algorithm tends to produce solutions with unschedulable events with alarming frequency.

An additional menu item was added to the **Schedule** menu to allow selection of either the suggestion tabulator or genetic algorithm as the solution method by checking the appropriate item in the menu. To aid in the debug and optimization of the algorithm, a few additional dialog boxes and menu items were added. First, a dialog was added to allow the genetic algorithm parameters to be changed interactively. This was convenient as it was anticipated that a large number of scenarios would be run while varying the basic genetic algorithm parameters to try and find an optimum combination. Additionally, a debug dialog was added allowing the user to view the results of the genetic algorithm on a generation by generation basis.



After a little experimentation, it appeared that the best approach appeared to use an elitist replacement strategy with a uniform crossover breeding approach. The elitist replacement strategy replaces the worst individuals in the next generation with the best individuals from the current generation. This strategy was used because it appeared during preliminary analysis that some of the good solutions were being lost in the reproduction process.

Uniform crossover mates two chromosomes by introducing a randomly generated crossover mask. Genes represented by bits set in the mask are taken from the mother; genes represented by cleared bits in the mask are taken from the father. This appeared to give the best results in the trials.

One important thing to remember is that genetic algorithms by their very nature are random and do not tend to yield reproducible results. This was borne out in the testing. Whereas, given the same input, the suggestion tabulator always arrived at the same answer; the genetic algorithm usually yielded widely varying answers even though the satisfaction values may have been similar. Various studies were done on a 50 event schedule to determine the effects of varying the mutation rate and crossover probabilities. These results are reflected in Figures 2,3 and 4. Neither one of the graphs shows any clear cut trend or optimum especially in the case of mutation rate. It appears, however, that the genetic algorithm approach is useful for 100 events or less.

The best values appear to be 0.05 for the mutation rate and 0.9 for the crossover probability although there appears to be such a wide variation in the numbers that the use of the values as optimal appears questionable. The genetic algorithm yields very tight compact schedules with events scheduled in the minimum time span required. By contrast, while satisfying the schedule constraints,

the traditional methods, namely suggestion tabulator and hill climbing tend to do so by spreading out the schedule and increasing the schedule makespan.

The length of time that the genetic

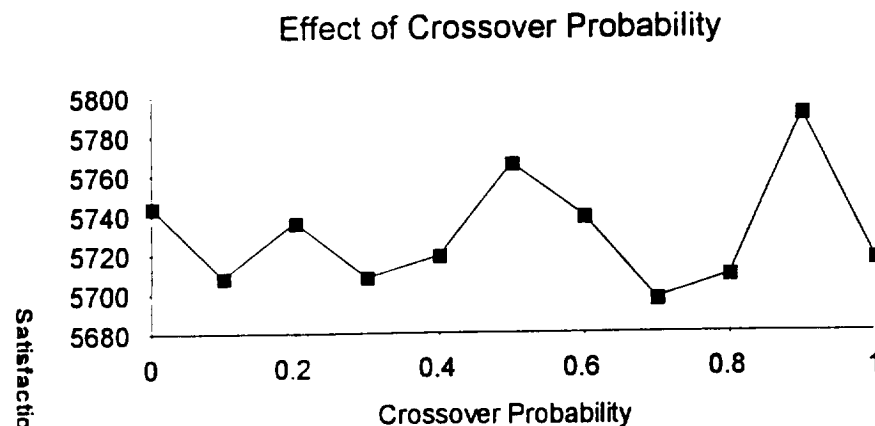


Figure 4 - Uniform Crossover

algorithm takes is due mainly to the need to calculate schedule satisfaction for multiple schedules each generation. Compounding this is the requirement to process many generations before arriving at the solution. By contrast, the hill climbing and suggestion tabulator deal with the schedule in a much more localized manner. Each event has its satisfaction calculated individually and is then moved accordingly resulting in fewer satisfaction calculations in arriving at a final solution.

1.2.4 User Interface Design

The displays must be familiar and easily recognized by the users. They must also allow the user to grasp any change in the data and the significance of that change instantly.

To aid in user comprehension, GUESS is implemented in the broadest terms of flexibility. Its unique design allows the user to alter the organization of the GUESS display and desktop. By altering the look of GUESS to one that is more familiar to the operators, one can save much of the time they would spend adapting to the new system. This would also significantly reduce the learning curve for new operators.

To that end, we have put considerable resources behind the development of Graphical User Interfaces, such as Visual Basic Xtensions (VBX). These systems allow us to display information in simple two or three-dimensional charts of many different types. This will allow the user to “customize” the interface to their own personal tastes. In a mission-critical atmosphere, the user will be able to select the charts that he or she can best understand quickly, making the interface far more useful. GUESS will remember those changes and present the interface in that fashion until told otherwise. So once the system is “customized”, there is no need to repeat the effort. For a system with multiple users, multiple environments can be set so that each user would have his/her own individual “look” if he/she wished.

GUESS avoids the complexity inherent in many scheduling systems by letting the user decide how much of the system he wishes to use. Instead of having to wade through a thick book of directions, GUESS is designed in an intuitive fashion and conforms to the GUI standards laid out by the industry.

GUESS is designed with a stair-step approach to learning. From the start, the user can run the system on pre-set defaults, if that is what he wants; there is no need to change anything. This is the first level of GUESS operation. When he wishes to add other options, the functions in GUESS can be added one at a time so a new user doesn't get overloaded with all the changes. They can also be added in groups for power-users who are already familiar with the system. This puts the complexity of the system in the hands of the user.

The principal idea behind the GUESS system was to build a system so flexible that it would fill a broad spectrum of needs. This flexibility is implemented in the “Loosely Bound”

architecture that comprises the GUESS system. Instead of having one rigid program, GUESS relies on a series of programs related by a message loop.

GUESS capitalizes on this open-architecture by allowing for the addition of other programs to be added to the message-loop. New programs or additional modules can be added to the system simply by loading them to the GUESS directory. The main GUESS program will scan the local directory and link all the modules found. If a specific module is needed, it will give a warning about the omission.

By using the Object-Oriented Approach, GUESS allows the user to become an active part of the system and alter major parts of the interface. This segmenting of the program code makes for a more compact program with less extraneous code. This eliminates a lot of operational overhead and helps the memory burden on the computer. Only the sections that are needed have to be loaded into the system.

1.2.5 Resource Modeling

Almost all scheduling problems depend in part on the availability of the necessary resources being present at the time of execution of a scheduled event. Some problems are primarily resource constrained while in other problems there are a sufficient abundance of resources such that resources do not seriously constrain the scheduling. For GUESS, it was deemed necessary to add a generic resource model, capable of handling most resources that could conceivably be used in scheduling situations.

For purposes of scheduling there appear to be two generic types of resources that could be used to model most resources used within a scheduling scenario. These are termed "Binary" and "Depletable" resources respectively. A binary resource is a resource of which a fixed amount is available at any given time, the resource is not depleted or consumed by the events utilizing it. An example of a binary resource might be the crew members on a space shuttle mission. Crew members may be utilized on a specific task but are not depleted or destroyed by the event. They are immediately available to tackle another task on completion of the present task. The function of the scheduling algorithm is to make sure that these binary resources are not overcommitted at any given point in time.

Depletable resources, on the other hand, are in fact consumed by tasks using them. As different events occur, these events utilize a portion of the resource until the resource is completely consumed and there is nothing left to consume. As well as consuming the resource, it is possible for certain events to replenish the resource. Typical systems that might be modeled by this approach include the consumption of propellant by a spacecraft as a result of various maneuvering events or the drain on the spacecraft battery caused by the operation of electrical equipment. In the case of the propellant, it is unlikely that events would occur to replenish the resource--in the case of the battery, recharging could occur by orienting the solar panels toward the sun.

The function of the resource scheduler is to schedule the activities to prevent depletion of the resource before all of the required activities are complete. In the case of resources that may be recharged, the scheduling algorithm must schedule sufficient recharging events between uses to keep adequate resources in hand to perform the necessary consuming activities. This involves alternating recharging and consuming activities in some pattern to sustain the resource.

These two types of resources are the most generic resources that can be used within a scheduling context; however, it was also felt necessary to allow the addition of custom resource models, that could be user-designed yet easily integrated within the GUESS scheduling engine. These custom models could be integrated as Dynamic Link Libraries (DLL's) and attached on the fly to the GUESS executable. This would allow unlimited flexibility for GUESS and would relieve the designers of having to anticipate unusual resource models or bloating the code in trying to incorporate every conceivable resource model within GUESS.

This choice of models provided a suitable methodology for modeling of resources within GUESS while providing plenty of room for future expansion. The next decision was the scheduling algorithms to be used in satisfying the resource constraints and their relationship to the algorithms already being used to schedule other constraints within the schedule. Rather than attempting to build an external resource model, it was felt to be beneficial to integrate the resource constraint satisfaction mechanism within the existing constraint satisfaction methods.

There are two reasons for deciding upon this approach:

- o Resource constraints are in fact just another form of constraint and it is beneficial to treat them in the same manner as other constraints from both a computational efficiency stand point as well as eliminating the need for doing several iterative calculations going from resources to constraints, in a back and forth motion, until the optimal solution to both problems is found.
- o Having a single algorithmic model makes for a very elegant solution. In fact the same optimization techniques can be used--the difference between the two types of constraints lies in the computation of its satisfaction score. The optimization algorithm need not be different. The "satisfaction criteria" is the only difference between the two.

The main emphasis in implementing a resource model for GUESS becomes a matter of determining the appropriate functions to use in computing resource satisfaction. The resource satisfaction should be a low value indicating a lack of satisfaction and forcing the offending event to be rescheduled if the event makes the resource usage exceed the total allowed. The resource usage if below the maximum allowed is an acceptable state of affairs and should give a satisfaction rating consistent with this. For a binary resource, maximum resource usage should be encouraged (as long as the maximum limit is not exceeded), since this will tend to decrease the schedule span and make use of the resource.

For a depletable resource, the situation is not quite so clear cut, since once a resource is gone, it must be either recharged (if it can be) or the resource is unusable for future activities. Therefore, the same positive satisfaction value is returned for all depletable resources whose usage is below the limit. A further simplifying assumption was made that resource usage is constant throughout the duration of the event. To get a profile of resource usage, resource usage is sampled throughout the duration of each event. A resource constraint satisfaction is obtained for each resource utilized by an event. A binary resource constraint will compute usage by integrating the resource usage over the time period of the event.

The algorithm first discards all events which do not overlap with the time period of interest. Then an adjustment is performed to obtain an adjusted average over the period of time for which the event overlaps. The implicit assumption is made that resource usage is linear over the event duration and multiple parallel events affect depletion in a linear additive fashion.

Usage for a depletable resource is calculated in a similar manner as that for a binary resource with the principal difference being that all events scheduled prior to the beginning of the time period of interest must also be summed. In this instance, an overlapping event is defined as an event whose start time is less than the end of the interval of interest.

To allow the resource model in GUESS to be readily extensible a feature for allowing the addition of custom resources was incorporated. The most flexible approach to doing this is to allow the user to add a custom dynamic link library which can be linked on the fly to the GUESS application. Doing so requires a standard application programming interface (API) to be developed to allow communication between the DLL and the GUESS engine. This requires a definition of entry points and types to be utilized within the DLL. The GUESS executable loads the DLL using the standard Windows function LoadLibrary function and then attempts to load each of the exported entry points by name. GUESS loads each of the entry points by name rather than the number even though loading by number is slightly more efficient--loading by name is easier to use and manage. As GUESS looks up the function pointers when the DLL is initially loaded, this causes an imperceptible performance penalty. If GUESS either cannot load the library or cannot find one of the required functions, then an error message is reported.

When a resource is over committed and needs to be rescheduled, the suggestion preferred is to reschedule the current event to occur just after the last event using the resource. Since events are processed in priority order, this forces lower priority items to be scheduled later than high priority events. A more sophisticated means of producing suggestions could be included as a later enhancement; however, for the test cases considered, the suggestion strategy yielded acceptable results.

2.0 TESTING RESULTS FROM GUESS

Besides testing GUESS on NASA-related problems, we wanted to test how generic GUESS truly is. To do so, we tested GUESS on a variety of scheduling applications. Specifically, we used the following test cases: (1) scheduling Army battalion training exercises,

(2) scheduling the arrival of military units in a deployed theater, (3) scheduling the City of Rockville Baseball schedule, and (4) scheduling Montgomery College Department of Computer Science courses. Problem description and test results are explained next, with detailed test input/output appearing in the Appendices. In addition to these different types of scheduling problems, we built and used two test builders (one with and one without nesting of events) to generate NASA Goddard-related test cases.

2.1 SCHEDULING ARMY BATTALION TRAINING EXERCISES (ALSO SEE APPENDIX B FOR MORE DETAILS)

I. Problem Description

The Army battalion scheduling test case can be described as follows:

- A set of battalions have to be scheduled.
- Each battalion has to perform pre determined tasks with time phase indicated.
- Each task has a known duration.
- Each task may not be started until specific preceding tasks are completed.
Task 10 occurs before task 5.
- Contingency constraints: task 5 and task 9 are performed jointly.
- Resource availabilities are limited each day.
- Each task requires a certain amount of different resources

II. Resources

- The Resource consumption matrix indicates the amount of resources being used by each task. There are 10 different types of resources. The resources are considered to be binary type resources with their total availability being indicated in the matrix.

Resource consumption matrix

Resource type	1	2	3	4	5	6	7	8	9	10
Task type 1	2	0	2	0	4	7	0	0	3	0
Task type 2	6	4	3	2	0	3	0	0	0	1
Task type 3	0	1	4	0	1	2	1	2	0	0
Task type 4	0	0	5	4	1	4	1	4	0	4
Task type 5	3	0	0	2	0	6	1	3	2	0
Task type 6	0	0	0	3	2	0	1	4	0	0
Task type 7	5	2	0	0	4	2	0	2	0	0
Task type 8	0	1	4	0	0	0	2	0	0	2
Task type 9	0	0	5	3	1	0	2	0	3	1
Task type 10	1	0	6	1	0	0	0	4	0	1
Availability	7	7	11	11	8	13	6	7	9	7

The resources are set up as follows:

RB R1 7

RB R2 7

RB R3 11

indicates that R1 is a binary resource with 7 units of availability.

Cr blt1-1 R1 50 2

means Cr is a resource constraint, blt1-1 is the event's name which consumes the resource R1, 50 is the weight and 2 is the units of consumption of the resource.

III. Constraints

- For scheduling purposes there are relational constraints acting on events to be scheduled. Task 5 must start with task 9 which means that task 5 and task 9 must be performed jointly. This is accomplished by the during constraint represented as follows:

cd Con 50 b3t5-1 b1t9-1

cd Con 50 b1t9-1 b3t5-1

cd indicates that it is a during constraint, Con is the name of the constraint, 50 is the weight of the constraint (the higher the value the stronger is the constraint).

b3t5-1 is the constrained event while b1t9-1 is the constraining event.

The precedence relation indicates that Task 10 should occur before task 5 which is represented as follows:

Cb Con 50 b3t10-1 b3t5-1

Ca Con 50 b3t5-1 b3t10-1

Cb indicates it is a before constraint with a weight of 50 and b3t10-1 is the constrained event.

b3t5-1 is the constraining event. Ca indicates that it is an after constraint indicating that b3t5-1 the constrained event occurs after b3t10-1 the constraining event. All the events performed by the battalion are scheduled to occur during the eworld event using a during constraint.

IV. Events

- An event is the performance of a task by a battalion.
- Each battalion has to perform a task “n” number of times as indicated in the task frequency matrix.
- The time phases for each battalion are included. Each task consumes resources as indicated in the resource consumption matrix. The duration for each task is also indicated in the task frequency matrix.

Task frequency matrix

Task type	1	2	3	4	5	6	7	8	9	10
Battalion 1	2	1	2	3	0	0	1	0	1	1
Battalion 2	0	2	1	2	0	3	0	0	1	0
Battalion 3	1	0	1	2	1	4	0	2	0	1
Battalion 4	0	3	0	1	0	1	1	1	0	1
Battalion 5	1	0	2	1	1	4	1	0	0	1

Duration	3	2	3	2	4	1	4	3	4	4
----------	---	---	---	---	---	---	---	---	---	---

ebase b5t3-1 12 15 10

indicates that b5t3-1 is an event where battalion 5 does task 3 the first time, starting time 12 and ending is 15 with a priority of 10.

V. Final Results

The Input file copy is enclosed. The input file was run using GUESS under three different modes: suggestion tabulator, hill climbing, or genetic algorithm. The performance of the scheduling algorithm is indicated:

	Suggestion Tab	Hill	GA
Overall Satisfaction	5860	6457	6457
Schedule Span	60	59	59

$$\begin{aligned} \text{Theoretical Overall Satisfaction} &= \text{Number of events} * \text{Max. Satisfaction} \\ 52 &* 127 = 6604 \end{aligned}$$

All Output files are enclosed.

2.2 SCHEDULING THE ARRIVAL OF MILITARY UNITS IN A DEPLOYED THEATER (ALSO SEE APPENDIX C FOR MORE DETAILS)

I. Problem Description

The Crisis Action Model (CAM) scheduling test case involves scheduling the movement of men and supplies from the home bases to the theater to support military action within the theater. The selection of units to move to the theater must be determined in advance. The Guess scheduler is then used to produce a detailed schedule for the movement of men and supplies to support the deployment. As a test case, a deployment to the Korean peninsula was chosen.

- A set of military units must be scheduled for deployment to the theater.
- Each of the different types of units has varying requirements regarding the amount of men and ancillary equipment that must be transported to the theater.
- Each of the units consumes varying amounts of ammunition, fuel oil (POL) and other supplies. The consumption is different prior to start of hostilities and after hostilities have commenced. An adequate reserve stock must exist in the theater to support combat operations.
- Units require a certain notification period before they can be moved. Transport times and assembly times vary with the unit.
- Certain supplies, equipment and manpower can travel by air. For others, sea transport is required. Finite transport time and return time for the transports is required.
- Port and airfield facilities have a finite capacity that can be handled on a daily basis. The capacity varies with respect to the particular port or airfield.
- There are a finite amount of transports of each type available. They require different mobilization times and in many cases are mobilized in stages. Therefore, there is a varying amount of transport capacity available throughout the scenario.
- For purposes of the test case, all of the ports of departure are assumed to have unlimited capacity to service ships and planes. All of the bottlenecks are assumed to exist at the unloading points near the theater of operations.

II. Resources

The resources are modeled as depletable resources which means that they can be depleted and replenished throughout the exercise. A positive number in the resource constraint indicates that they are being depleted, a negative number indicates a replenishment. If there are insufficient resources available for an event at the time that it is currently scheduled it must be rescheduled for a time at which sufficient resources are available to bring it to a successful conclusion.

The following table illustrates the resources used in the deployment model:

Resource Name	Initial Quantity	Description
C141	210	210 C-141 CARGO PLANES @ 45 TONS EACH
C5	100	100 C-5 CARGO PLANES @ 101 TONS EACH
C17	20	20 C-17 CARGO PLANES @ 86 TONS EACH
CRAF	30	30 CRAF CARGO PLANES @ 70 TONS EACH
PAX	34	34 C-141 PAX PLANES @ 200 EACH
RRFFAST	0	NO FAST SEALIFT SHIPS AVAIL @ N-DAY
RRFCARGO	0	NO RRF CARGO SHIPS AVAIL @ N-DAY
RORO	0	NO RO-RO SHIPS AVAIL @ N-DAY
DRYCARGO	0	NO DRY CARGO SHIPS AVAIL @ N-DAY
TANKER	0	NO TANKER SHIPS AVAIL @ N-DAY
AMMO	120000	120K TONS AMMO ON SITE @ N-DAY
POL	83330	83.33K GAL POL ON SITE @ N-DAY
OTHER	149000	149K TONS OTHER SUPPLIES ON SITE @ N-DAY
PAXEAST	0	PAX ON EAST COAST TO BE MOVED
EQUIPEAST	0	EQUIPMENT ON EAST COAST TO BE MOVED
PAXGULF	0	PAX ON GULF COAST TO BE MOVED
EQUIPGULF	0	EQUIPMENT ON GULF COAST TO BE MOVED
PAXWEST	0	PAX ON WEST COAST TO BE MOVED
EQUIPWEST	0	EQUIPMENT ON WEST COAST TO BE MOVED

All of the resources are specified as depletable resources. Many of the resources are shown as having a zero initial value. These resources are not available at the start of the exercise but become available later in the exercise based upon a mobilization being carried out or some other activity which produces these resources. This is indicated in the model by providing a negative depletion of the resource associated with the event.

III. Constraints

For purposes of assuring that the events occur in the correct order, it is necessary to specify

constraints among the events. For example, supplies cannot be unloaded before they are transported accross the ocean. Certain significant milestones are established and locked in time. They include the notification of mobilization, as well as, the significant mobilization milestones that are assumed to take place at fixed times following the mobilization order.

It is neccesary to provide complementary “before” and “after” constraints to force Guess to schedule events in the proper sequence. For example, to force event E2 to occur after E1, E2 must be given an “after” constraint with respect to E1 and E1, in turn, must be given a “before” constraint to force the proper relationship.

“During” constraints are used to specify that an event occurs simulataneously with another event. Constraints are used to set the major events in a relative order of execution.

IV. Events

Three basic classes of events are used to represent the activities required in the Crisis Action Model. The first type of event is the milestone event used to fix certain critical events within the deployment that are known to occur at certain fixed times. These are the dates of mobilization of the various reserves and transport capability.

The second category of events deals with the deployment of the units themselves. This involves the notification, the movement to the points of embarkation, the transport to the theater points of entry and and the movement and assembly at the staging areas. These involve the consumption of various resources at different stages in the journey. These activities are depicted in Figure 1.

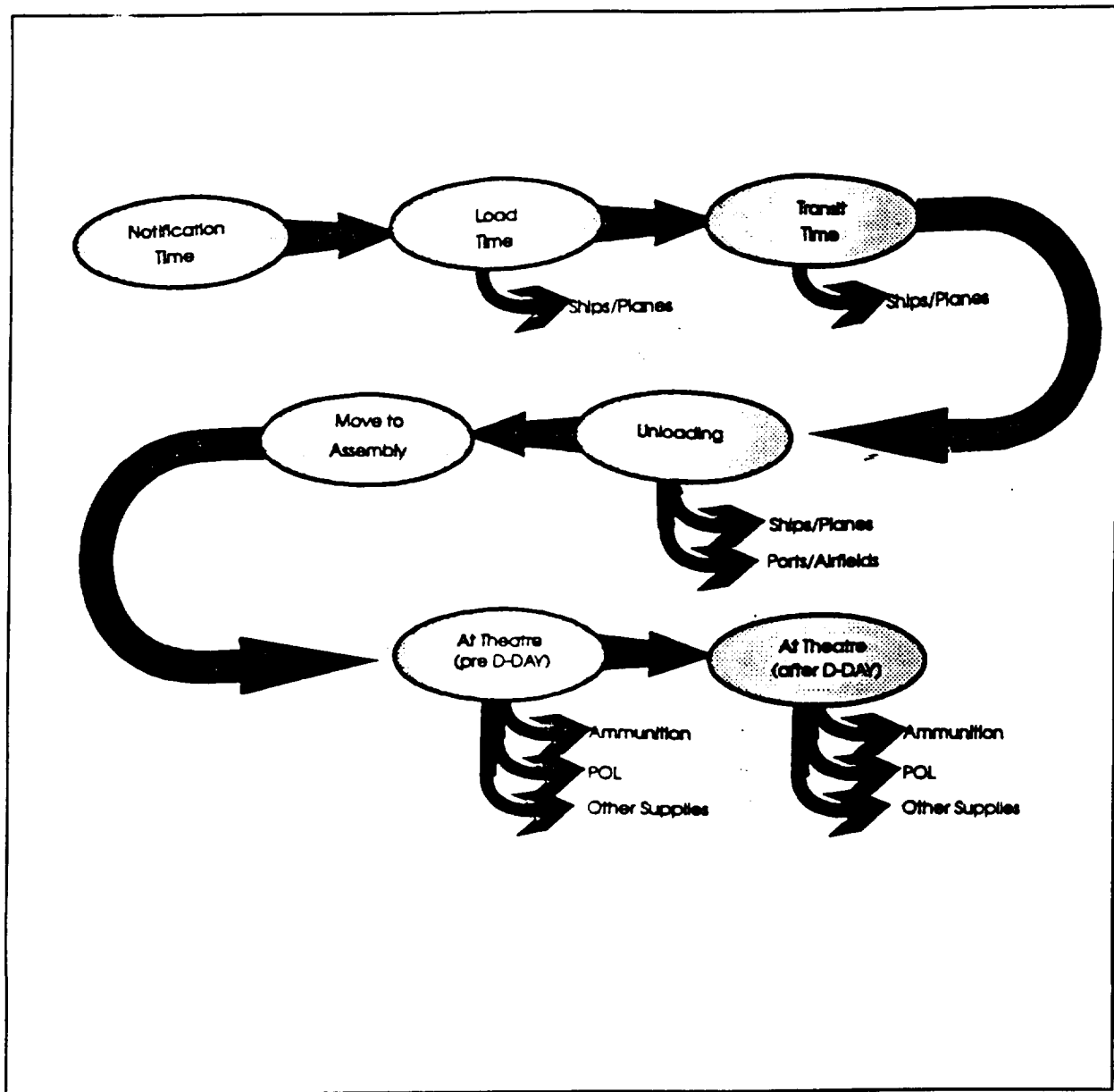


Figure 1 - Deployment of Units

The shipment of supplies to the theater constitutes the third class of events and is broken down into load, transit and unload events. The relationship between these events is maintained using the appropriate constraints. A return transit event is also included to allow the transport elements time to return to the embarkation points.

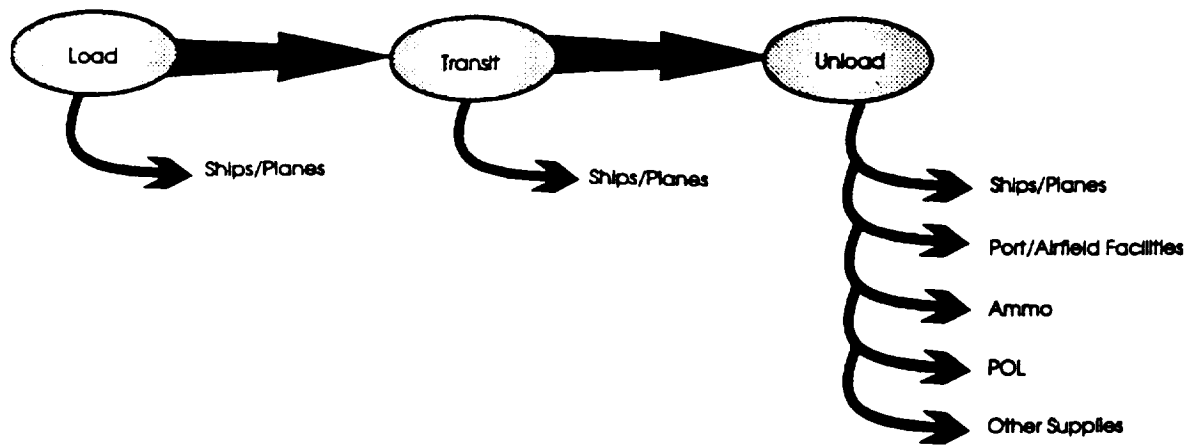


Figure 2-Shipment of Supplies

V Final Results

The input file is enclosed. All three methods available to GUESS were run. They are the suggestion tabulator, hill climbing and genetic algorithm approaches.

	Suggestion Tabulator	Hill Climbing	Genetic Algorithm
Overall Satisfaction	4296	5139	4709
Number of Unscheduled Events	23	7	1
Time taken for Scheduling (secs)	6	15	37

All of the output files are enclosed.

2.3 SCHEDULING THE CITY OF ROCKVILLE BASEBALL SCHEDULE (ALSO SEE APPENDIX D FOR MORE DETAILS)

I. Problem Description:

Scheduling of baseball games for the City of Rockville baseball leagues can be described as follows:

- A set of games has to be scheduled for the leagues in a division.
- Each league may have 10-14 teams.
- A game between two teams is an event to be scheduled and has a known duration.

- Each team has to play a total of 14 games in a schedule of length of 7 weeks.
- Each team has to play 2 games per week , one weekday and one weekend.
- Each team has to play all other teams in a league.
- Resource availabilities are limited.
- Each task requires a resource.

II. Events

- An event is a game scheduled between 2 teams in the division.
- Each team has to play a total of 14 games over a schedule span of 7 weeks.
- Each team has to play one weekday and one weekend game.
- Each game has a known duration of 2.5 hours.
- All events/games are to be scheduled within the event of 7 weeks which is the total schedule span.
- Each team has to play all other teams in the league.

eb e1G11 1050 1200 10 indicates that e1 G11 is an event where team 1 plays team 11, and the starting time of the game is 1050 and ending time is 1200 and the priority of the game is 10.

III. Resources

- The resources are the baseball fields available for the games in a particular division.
- The resources are modeled as binary type and the games generated are scheduled to be played on the particular fields available based on the constraints.

The resources are setup as follows:

RB	M	1	MO	Monument
RB	C	1	CG	College Gardens field
RB	L	1	LO	Lone Oak
RB	S	1	DS	David Skull
RB	D	1	DW	Dogwood

indicates that C is the College gardens field, RB indicating it is a binary resource.

Binary resource indicates that if a field is allocated for a game then during that period of game that field is not available for other games.

CR E1G11 C 100 1

means CR is a resource constraint, e1G11 is the event's name which consumes the resource C, 100 is the unit of consumption.

IV. Constraints

- For scheduling purposes, there are relational constraints acting on events to be scheduled.

cd Con 50 E1G11 ew

cd indicates that it is a during constraint.

Con is the name of the constraint. 50 is the weight, e1G11 is the constrained event while ew is the constraining event

V. Final Results

- The input file copy is enclosed. The input file was run using GUESS under the two different modes. The performance of the scheduling algorithm is indicated.

	Suggestion tabulator	Hill climbing
Overall Satisfaction	21336	21336
Schedule Span	10079	10079

$$\begin{aligned}\text{Theoretical Overall Satisfaction} &= \text{Number of events} * \text{Max. Satisfaction} \\ &= 168 * 127 = 21336\end{aligned}$$

2.4 SCHEDULING MONTGOMERY COLLEGE COMPUTER SCIENCE DEPARTMENT COURSES (ALSO SEE APPENDIX E FOR MORE DETAILS)

I. Problem Description

A scheduling problem like time tabling is a classic problem in universities and schools. Class scheduling is a laborious and time consuming task. Currently, the class schedules for the Information Science department at Montgomery College are being done manually.

The time tabling problem at MC IS department is treated as a faculty vs courses scheduling problem. GUESS with its object oriented technology has been used to solve the class scheduling

problem in an efficient way using a combination of model and data from the IS department.

Class scheduling in the IS department is an important sub class of the scheduling problem, where the objective is to assign the various class time periods to the different faculty such that various constraints and resource allocations are satisfied. Information about classes and instructors of the Information Science department was collected as input to the GUESS system.

II. Events

- An event is a class that has to be scheduled.
- The time phase for each class is indicated with the duration. Each class consumes different resources as indicated in the resource array.

eb CS110-1271-MWF 841856400 841856450 10

indicates that CS110-1271-MWF is the event's name

where CS110 is the name of the course,

1271 is the section number,

MWF indicates the frequency of the class meeting on Monday, Wednesday, Friday,

841856400 indicates the starting time of the class in seconds,

841856450 indicates the ending time in seconds.

10 indicates the priority of the event.

III. Resources

The class rooms and the faculty are considered as resources.

Both types of resources are considered to be binary type.

The resources are set up as follows:

RB CS22-30 1

RB indicates that it is a binary resource,

CS22-30 indicates that the room number is 22 in CS building and 30 is the maximum number of students in the class that can be scheduled.

RB FACL-1 1

FACL-1 indicates the faculty name FACL-1.

IV. Constraints

For scheduling purposes there are relational constraints acting on events in addition to the resource constraints to be scheduled.

CR CS110-1271-MWF CS16-30 100 1

This is a resource constraint which indicates that the event CS110-1271-MWF uses the resource CS16-30 and the weight is 100 and 1 is the usage count.

V. Final Results

The input and output files are enclosed.

2.5 SUMMARY OF TEST RESULTS

In reviewing the test results, GUESS schedules very well in terms of its effectiveness and efficiency for a variety of different scheduling cases. All three scheduling methods (i.e., suggestion tabulator, hill climbing, and genetic algorithm) usually give excellent results. There is a tradeoff however between time it takes to schedule versus effectiveness/satisfaction of events scheduled. Typically the suggestion tabulator and hill climbing approaches reach an excellent schedule before the genetic algorithm approach arrives at a good schedule. We have also found some randomness in the scheduling results using the genetic algorithm; therefore, we have found the genetic algorithm to work best for around 100 events. The heuristic approaches of our suggestion tabulator and hill climbing algorithm usually present the best scheduling results within the shortest period of execution/run time.

Overall, GUESS produces excellent scheduling results in a very timely manner.

3.0 FUTURE DIRECTIONS FOR GUESS

3.1.1 Developing Database Interfaces to GUESS

One of the major future efforts for GUESS is to develop database interfaces to GUESS for ease of inputting the events, constraints, and resources. Currently, the user has to enter the events and associated resources and constraints into GUESS one-by-one. For large scheduling cases (especially in the NASA environment of several thousand events), this could be a time-intensive effort. For commercialization of GUESS, there is a need for establishing database links with popular database packages (e.g., Access, etc.) (and even spreadsheet packages like Excel) for an efficient way of entering the data for scheduling. We currently have a test case generator to facilitate the generation of multiple events, constraints, and resources. However, for customization purposes, establishing the database/spreadsheet links are essential for enhancing GUESS during the Phase 3 commercialization effort.

3.1.2 Categorize Different Scheduling Problems and Develop Generic Scheduling Models for Each Within GUESS

In testing the current version of GUESS, various types of scheduling problems were used. These included: an Army strategic scheduling problem of assigning units in a deployed theater; scheduling Army battalion training exercises; scheduling City of Rockville Pee Wee and Midget baseball games; scheduling Department of Computer Science courses and corresponding sections for Montgomery College; and scheduling NASA experimenter requests to use NASA-supported satellites. We have included some scheduling frameworks within GUESS to facilitate different types of scheduling problems (e.g., timetabling, game scheduling, classroom scheduling, job shop scheduling, etc.). However, we need to further develop these frameworks and include within GUESS other frameworks based on the type of scheduling problem. In this manner, GUESS will include the framework and user interface for different types of scheduling problems. This should also allow improved efficiency in inputting the scheduling data for a particular class of scheduling problems.

3.1.3 Develop a Test Suite of Different Types of Scheduling Cases to Run Against GUESS Each Time a New Scheduling Technique is Included in GUESS

We currently have a useful test generator that helps in developing test cases for GUESS. However, we need to have a more complete test suite of different types of scheduling cases to run against GUESS each time a new scheduling technique is included in GUESS. This test suite should include different classes of scheduling problems that are heterogeneous in order to test the new scheduling methods within GUESS for effectiveness and efficiency. Manufacturing scheduling test cases need to be added to our test suite.

3.1.4 Improved Methods for Customizing the Report Generation Function of GUESS

Through the Gantt.VBX in GUESS, we have some control in customizing the scheduling report. We can perform sorting by event name, date, resource, etc., but we need to have other options available for customizing the scheduling report for the user. For example, the athletics scheduler may want to have the scheduling report by baseball field, team, player, week, game, etc. and GUESS should be flexible enough to handle these demands. Customizing the report generation function for the user will also help in user acceptance of GUESS.

4.0 REFERENCES

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APPENDICES

Appendix A: Custom Resource Modeling

This appendix lists the function calls that a custom resource model library must support. It gives the function prototype, the arguments, and the value returned by the function. This does not inhibit the resource model by containing as many private functions as is necessary. Because the interface is defined in terms of a standard Windows API interface it does not presuppose the use of a specific language (e.g. C++) or a specific compiler vendor. It may be written using any tools that support writing 16 bit Windows 3.1 DLL's.

Custom Resource Functions

FUNCTION	PURPOSE
CreateNewResource	Creates a new custom resource using the library. Library may optionally put up a dialog box to query user for information.
CreateResource	Creates a custom resource intended to be used when reading in a schedule from a file, as input a character string is passed giving the necessary parameters.
DeleteResource	Deletes a resource and allows the library a chance to deallocate any memory it may have allocated on the heap to process the resource.

Custom Resource Functions

GetName	This just returns the name of the library.
GetDescription	This returns a human readable description of the library for display to the user.
GetResourceValue	This does the resource utilization calculations. It is called GUESS whenever it needs to calculate the resource value being used in any time interval. The library in turn calls an iterator function which obtains the resource usage during the time slices it requires for the calculation. It returns a resource used figure.
WriteResource	This allows any specific parameters required by the library to be written out when the file is saved. This string is read by CreateResource.

Custom Resource Functions

GetName

This just returns the name of
the library.

long CreateNewResource (long ResourceID)

ResourceID

Resource Identifier for use by GUESS. Resource ID is used in to get resource values during specific time periods from GUESS.

Returns

An identifier with significance to the library. Identifier is opaque to GUESS and usually points to the structure representing the resource within the library

long CreateResource (long ResourceID, FAR char*str)

ResourceID

Resource Identifier for use by GUESS. Resource ID is used to get resource values during specific time periods from GUESS.

longCreateResource (long ResourceID, FARchar*str)

str

String identifying additional parameters required to properly initialize the saved resource. This string is the same string that is output by the WriteResource function.

Returns

An identifier with significance to the library. Identifier is opaque to GUESS and usually points to the structure representing the resource within the library.

double (*ResourceFunction)(long id,long StartTime,long EndTime)

id	The resource id passed in as the ResourceID argument to either CreateResource or CreateNewResource.
StartTime	The starting time for collecting the resource usage. Typically the library calls this function repeatedly with StartTime incrementing by StepTime each time.
EndTime	This is the ending time for the time slice over which the resource value is desired.
Returns	The resource usage over the specified time interval GUESS calculates by figuring which events occur during this interval and what use they make of this resource.

**Double GetResourceValue (long id, long
StartTime, long EndTime, double InitialValue,
long Step, ResourceFunctionUsage)**

InitialValue

void DeleteResource (long ResourceID)

ResourceID

**Resource identifier returned by
library from a call to either
CreateResource or
CreateNewResource.**

Double GetResourceValue (long is, long StartTime, long EndTime, double InitialValue, long Step, ResourceFunction Usage)

id	The id returned from CreateResource or CreateNewResource.
StartTime	Starting time for interval that resource value is being queried.
EndTime	Ending time for interval that resource value is being queried.

**double GetResourceValue (long id, long Start time, long EndTime, double
initialValue, long Step, ResourceFunction Usage)**

id	The id returned from CreateResource or CreateNewResource.
StartTime	Starting time for interval that resource value is being queired.
EndTime	Ending time for interval that resource value being queired.
InitialValue	The initial value of the resource at the StartTime.
Step	This is the step time to be used. This allows GUESS to determine a step time which balances computational accuracy with speed.
Usage	A Usage function that the library iteratively calls to determine resource usage for each time slice within the time range sought. See ResourceFunction description for parameters.
Returns	Returns the value of the resource at the EndTime specified.

void WriteResource (long id, FAR char*str, int maxien0

id

The resource id returned by either CreateResource or CreateNewResource.

str

A string in which to write the character string. The library is responsible for the format of this string. It is designed for performing file saves and will be read in again CreateResource when the file is re-opened.

maxien

The maximum length of the str string. The library is responsible to assure that the size of the string including the terminating NULL does not exceed this length.

FAR char* GetDescription ()

Returns

**Character string giving a description
of the resource model.**

Number of Events 52
Number of Resources 10
Satisfaction 5860 Maximum Satisfaction 6604 Unschedulable Events 0
Schedule Span 60

Appendix B-1

Statistics from GUESS Using the Suggestion Tabulator Approach for the Army Battalion Test Case

Number of Events 52
Number of Resources 10
Satisfaction 6457 Maximum Satisfaction 6604 Unschedulable Events 0
Schedule Span 59

Appendix B-2

Statistics from GUESS Using the Genetic Algorithm Approach for the Army Battalion Test Case

Number of Events 52
Number of Resources 10
Satisfaction 6457 Maximum Satisfaction 6604 Unschedulable Events 0
Schedule Span 59

Appendix B-3

Statistics from GUESS Using the Hill Climbing Algorithm for the Army Battalion Test Case

ebase ew 1 60 10

RB R1 7 This is a Binary resource with availability indicated
RB R2 7 This is a Binary resource with availability indicated
RB R3 11 This is a Binary resource with availability indicated
RB R4 11 This is a Binary resource with availability indicated
RB R5 8 This is a Binary resource with availability indicated
RB R6 13 This is a Binary resource with availability indicated
RB R7 6 This is a Binary resource with availability indicated
RB R8 7 This is a Binary resource with availability indicated
RB R9 9 This is a Binary resource with availability indicated
RB R10 7 This is a Binary resource with availability indicated

ebase blt1-1 1 4 10 blt1-1 is an event of battalion 1 performing task 1 for first time
cd con 50 blt1-1 ew

ebase blt2-1 4 6 10
cd con 50 blt2-1 ew

ebase blt3-1 6 9 10
cd con 50 blt3-1 ew

ebase blt4-1 9 11 10
cd con 50 blt4-1 ew

ebase blt7-1 11 15 10
cd con 50 blt7-1 ew

ebase blt9-1 15 19 10
cd con 50 blt9-1 ew

ebase blt10-1 19 23 10
cd con 50 blt10-1 ew

ebase blt1-2 23 26 10
cd con 50 blt1-2 ew

ebase blt3-2 26 29 10
cd con 50 blt3-2 ew

ebase blt4-3 29 31 10
cd con 50 blt4-3 ew

ebase blt4-2 31 33 10
cd con 50 blt4-2 ew

ebase b2t2-1 1 3 10
cd con 50 b2t2-1 ew

ebase b2t3-1 3 6 10
cd con 50 b2t3-1 ew

ebase b2t4-1 6 8 10
cd con 50 b2t4-1 ew

ebase b2t6-1 8 9 10
cd con 50 b2t6-1 ew

ebase b2t9-1 9 13 10
cd con 50 b2t9-1 ew

ebase b2t2-2 13 15 10

Appendix B-4

Input File for the Army Battalion Test Case

cd con 50 b2t2-2 ew

ebase b2t4-2 15 17 10
cd con 50 b2t4-2 ew

ebase b2t6-3 17 18 10
cd con 50 b2t6-3 ew

ebase b2t6-2 18 19 10
cd con 50 b2t6-2 ew

ebase b3t1-1 1 4 10
cd con 50 b3t1-1 ew

ebase b3t3-1 4 7 10
cd con 50 b3t3-1 ew

ebase b3t4-1 7 9 10
cd con 50 b3t4-1 ew

ebase b3t5-1 9 13 10
cd con 50 b3t5-1 ew

ebase b3t6-1 13 14 10
cd con 50 b3t6-1 ew

ebase b3t8-1 14 17 10
cd con 50 b3t8-1 ew

ebase b3t10-1 17 21 10
cd con 50 b3t10-1 ew

ebase b3t4-2 21 23 10
cd con 50 b3t4-2 ew

ebase b3t6-4 23 24 10
cd con 50 b3t6-4 ew

ebase b3t6-3 24 25 10
cd con 50 b3t6-3 ew

ebase b3t6-2 25 26 10
cd con 50 b3t6-2 ew

ebase b3t8-2 26 29 10
cd con 50 b3t8-2 ew

ebase b4t2-1 1 3 10
cd con 50 b4t2-1 ew

ebase b4t4-1 3 5 10
cd con 50 b4t4-1 ew

ebase b4t6-1 5 6 10
cd con 50 b4t6-1 ew

ebase b4t7-1 6 10 10
cd con 50 b4t7-1 ew

ebase b4t8-1 10 13 10
cd con 50 b4t8-1 ew

ebase b4t10-1 13 17 10

cd con 50 b4t10-1 ew

ebase b4t2-3 17 19 10
cd con 50 b4t2-3 ew

ebase b4t2-2 19 21 10
cd con 50 b4t2-2 ew

ebase b5t1-1 1 4 10
cd con 50 b5t1-1 ew

ebase b5t3-1 4 7 10
cd con 50 b5t3-1 ew

ebase b5t4-1 7 9 10
cd con 50 b5t4-1 ew

ebase b5t5-1 9 13 10
cd con 50 b5t5-1 ew

ebase b5t6-1 13 14 10
cd con 50 b5t6-1 ew

ebase b5t7-1 14 18 10
cd con 50 b5t7-1 ew

ebase b5t10-1 18 22 10
cd con 50 b5t10-1 ew

ebase b5t3-2 22 25 10
cd con 50 b5t3-2 ew

ebase b5t6-4 25 26 10
cd con 50 b5t6-4 ew

ebase b5t6-3 26 27 10
cd con 50 b5t6-3 ew

ebase b5t6-2 27 28 10
cd con 50 b5t6-2 ew

cb con 50 b3t10-1 b3t5-1 Before Constraint indicating that task10 should occur before task5
ca con 50 b3t5-1 b3t10-1 After Constraint indicating that task5 should occur after task 10
cb con 50 b5t10-1 b5t5-1 Before Constraint indicating that task10 should occur before task5
ca con 50 b5t5-1 b5t10-1 After Constraint indicating that task5 should occur after task 10

cd con 50 b3t5-1 b1t9-1 During Constraint indicating that task5 should occur during task10
cd con 50 b1t9-1 b3t5-1 During Constraint indicating that task10 should occur during task5
cd con 50 b5t5-1 b2t9-1 During Constraint indicating that task5 should occur during task10
cd con 50 b2t9-1 b5t5-1 During Constraint indicating that task10 should occur during task5

cr b1t1-1 R1 50 2
cr b1t1-1 R3 50 2
cr b1t1-1 R5 50 4
cr b1t1-1 R6 50 7
cr b1t1-1 R9 50 3
cr b1t1-2 R1 50 2
cr b1t1-2 R3 50 2

cr	b1t1-2	R5 50 4
cr	b1t1-2	R6 50 7
cr	b1t1-2	R9 50 3
cr	b3t1-1	R1 50 2
cr	b3t1-1	R3 50 2
cr	b3t1-1	R5 50 4
cr	b3t1-1	R6 50 7
cr	b3t1-1	R9 50 3
cr	b5t1-1	R1 50 2
cr	b5t1-1	R3 50 2
cr	b5t1-1	R5 50 4
cr	b5t1-1	R6 50 7
cr	b5t1-1	R9 50 3
cr	b1t2-1	R1 50 6
cr	b1t2-1	R2 50 4
cr	b1t2-1	R3 50 3
cr	b1t2-1	R4 50 2
cr	b1t2-1	R6 50 3
cr	b1t2-1	R10 50 1
cr	b2t2-1	R1 50 6
cr	b2t2-1	R2 50 4
cr	b2t2-1	R3 50 3
cr	b2t2-1	R4 50 2
cr	b2t2-1	R6 50 3
cr	b2t2-1	R10 50 1
cr	b2t2-2	R1 50 6
cr	b2t2-2	R2 50 4
cr	b2t2-2	R3 50 3
cr	b2t2-2	R4 50 2
cr	b2t2-2	R6 50 3
cr	b2t2-2	R10 50 1
cr	b4t2-1	R1 50 6
cr	b4t2-1	R2 50 4
cr	b4t2-1	R3 50 3
cr	b4t2-1	R4 50 2
cr	b4t2-1	R6 50 3
cr	b4t2-1	R10 50 1
cr	b4t2-2	R1 50 6
cr	b4t2-2	R2 50 4
cr	b4t2-2	R3 50 3
cr	b4t2-2	R4 50 2
cr	b4t2-2	R6 50 3
cr	b4t2-2	R10 50 1
cr	b4t2-3	R1 50 6
cr	b4t2-3	R2 50 4
cr	b4t2-3	R3 50 3
cr	b4t2-3	R4 50 2
cr	b4t2-3	R6 50 3
cr	b4t2-3	R10 50 1
cr	b1t3-1	R2 50 1
cr	b1t3-1	R3 50 4
cr	b1t3-1	R5 50 1
cr	b1t3-1	R6 50 2
cr	b1t3-1	R7 50 1
cr	b1t3-1	R8 50 2
cr	b1t3-2	R2 50 1
cr	b1t3-2	R3 50 4
cr	b1t3-2	R5 50 1
cr	b1t3-2	R6 50 2
cr	b1t3-2	R7 50 1
cr	b1t3-2	R8 50 2
cr	b2t3-1	R2 50 1
cr	b2t3-1	R3 50 4

cr b2t3-1 R5 50 1
cr b2t3-1 R6 50 2
cr b2t3-1 R7 50 1
cr b2t3-1 R8 50 2
cr b3t3-1 R2 50 1
cr b3t3-1 R3 50 4
cr b3t3-1 R5 50 1
cr b3t3-1 R6 50 2
cr b3t3-1 R7 50 1
cr b3t3-1 R8 50 2
cr b5t3-1 R2 50 1
cr b5t3-1 R3 50 4
cr b5t3-1 R5 50 1
cr b5t3-1 R6 50 2
cr b5t3-1 R7 50 1
cr b5t3-1 R8 50 2
cr b5t3-2 R2 50 1
cr b5t3-2 R3 50 4
cr b5t3-2 R5 50 1
cr b5t3-2 R6 50 2
cr b5t3-2 R7 50 1
cr b5t3-2 R8 50 2
cr b1t4-1 R3 50 5
cr b1t4-1 R4 50 4
cr b1t4-1 R5 50 1
cr b1t4-1 R6 50 4
cr b1t4-1 R7 50 1
cr b1t4-1 R8 50 4
cr b1t4-1 R10 50 4
cr b1t4-2 R3 50 5
cr b1t4-2 R4 50 4
cr b1t4-2 R5 50 1
cr b1t4-2 R6 50 4
cr b1t4-2 R7 50 1
cr b1t4-2 R8 50 4
cr b1t4-2 R10 50 4
cr b1t4-3 R3 50 5
cr b1t4-3 R4 50 4
cr b1t4-3 R5 50 1
cr b1t4-3 R6 50 4
cr b1t4-3 R7 50 1
cr b1t4-3 R8 50 4
cr b1t4-3 R10 50 4
cr b2t4-1 R3 50 5
cr b2t4-1 R4 50 4
cr b2t4-1 R5 50 1
cr b2t4-1 R6 50 4
cr b2t4-1 R7 50 1
cr b2t4-1 R8 50 4
cr b2t4-1 R10 50 4
cr b2t4-2 R3 50 5
cr b2t4-2 R4 50 4
cr b2t4-2 R5 50 1
cr b2t4-2 R6 50 4
cr b2t4-2 R7 50 1
cr b2t4-2 R8 50 4
cr b2t4-2 R10 50 4
cr b3t4-1 R3 50 5
cr b3t4-1 R4 50 4
cr b3t4-1 R5 50 1
cr b3t4-1 R6 50 4
cr b3t4-1 R7 50 1
cr b3t4-1 R8 50 4

cr b3t4-1 R10 50 4
cr b3t4-2 R3 50 5
cr b3t4-2 R4 50 4
cr b3t4-2 R5 50 1
cr b3t4-2 R6 50 4
cr b3t4-2 R7 50 1
cr b3t4-2 R8 50 4
cr b3t4-2 R10 50 4
cr b4t4-1 R3 50 5
cr b4t4-1 R4 50 4
cr b4t4-1 R5 50 1
cr b4t4-1 R6 50 4
cr b4t4-1 R7 50 1
cr b4t4-1 R8 50 4
cr b4t4-1 R10 50 4
cr b5t4-1 R3 50 5
cr b5t4-1 R4 50 4
cr b5t4-1 R5 50 1
cr b5t4-1 R6 50 4
cr b5t4-1 R7 50 1
cr b5t4-1 R8 50 4
cr b5t4-1 R10 50 4
cr b3t5-1 R1 50 3
cr b3t5-1 R4 50 2
cr b3t5-1 R6 50 6
cr b3t5-1 R7 50 1
cr b3t5-1 R8 50 3
cr b3t5-1 R9 50 2
cr b5t5-1 R1 50 3
cr b5t5-1 R4 50 2
cr b5t5-1 R6 50 6
cr b5t5-1 R7 50 1
cr b5t5-1 R8 50 3
cr b5t5-1 R9 50 2
cr b2t6-1 R4 50 3
cr b2t6-1 R5 50 2
cr b2t6-1 R7 50 1
cr b2t6-1 R8 50 4
cr b2t6-2 R4 50 3
cr b2t6-2 R5 50 2
cr b2t6-2 R7 50 1
cr b2t6-2 R8 50 4
cr b2t6-3 R4 50 3
cr b2t6-3 R5 50 2
cr b2t6-3 R7 50 1
cr b2t6-3 R8 50 4
cr b3t6-1 R4 50 3
cr b3t6-1 R5 50 2
cr b3t6-1 R7 50 1
cr b3t6-1 R8 50 4
cr b3t6-2 R4 50 3
cr b3t6-2 R5 50 2
cr b3t6-2 R7 50 1
cr b3t6-2 R8 50 4
cr b3t6-3 R4 50 3
cr b3t6-3 R5 50 2
cr b3t6-3 R7 50 1
cr b3t6-3 R8 50 4
cr b3t6-4 R4 50 3
cr b3t6-4 R5 50 2
cr b3t6-4 R7 50 1
cr b3t6-4 R8 50 4
cr b4t6-1 R4 50 3

cr	b4t6-1	R5 50 2
cr	b4t6-1	R7 50 1
cr	b4t6	R8 50 4
cr	b5t6	R4 50 3
cr	b5t6	R5 50 2
cr	b5t6-1	R7 50 1
cr	b5t6-1	R8 50 4
cr	b5t6-2	R4 50 3
cr	b5t6-2	R5 50 2
cr	b5t6-2	R7 50 1
cr	b5t6-2	R8 50 4
cr	b5t6-3	R4 50 3
cr	b5t6-3	R5 50 2
cr	b5t6-3	R7 50 1
cr	b5t6-3	R8 50 4
cr	b5t6-4	R4 50 3
cr	b5t6-4	R5 50 2
cr	b5t6-4	R7 50 1
cr	b5t6-4	R8 50 4
cr	b1t7-1	R1 50 5
cr	b1t7-1	R2 50 2
cr	b1t7-1	R5 50 4
cr	b1t7-1	R6 50 2
cr	b1t7-1	R8 50 2
cr	b4t7-1	R1 50 5
cr	b4t7-1	R2 50 2
cr	b4t7-1	R5 50 4
cr	b4t7-1	R6 50 2
cr	b4t7-1	R8 50 2
cr	b5t7-1	R1 50 5
cr	b5t7-1	R2 50 2
cr	b5t7-1	R5 50 4
cr	b5t7-1	R6 50 2
cr	b5t7-1	R8 50 2
cr	b3t8-1	R2 50 1
cr	b3t8-1	R3 50 4
cr	b3t8-1	R7 50 2
cr	b3t8-1	R10 50 2
cr	b3t8-2	R2 50 1
cr	b3t8-2	R3 50 4
cr	b3t8-2	R7 50 2
cr	b3t8-2	R10 50 2
cr	b4t8-1	R2 50 1
cr	b4t8-1	R3 50 4
cr	b4t8-1	R7 50 2
cr	b4t8-1	R10 50 2
cr	b1t9-1	R3 50 5
cr	b1t9-1	R4 50 3
cr	b1t9-1	R5 50 1
cr	b1t9-1	R7 50 2
cr	b1t9-1	R9 50 3
cr	b1t9-1	R10 50 1
cr	b2t9-1	R3 50 5
cr	b2t9-1	R4 50 3
cr	b2t9-1	R5 50 1
cr	b2t9-1	R7 50 2
cr	b2t9-1	R9 50 3
cr	b2t9-1	R10 50 1
cr	b1t10-1	R1 50 1
cr	b1t10-1	R3 50 6
cr	b1t10-1	R4 50 1
cr	b1t10-1	R8 50 4
cr	b1t10-1	R10 50 1

cr b3t10-1 R1 50 1
cr b3t10-1 R3 50 6
cr b3t10-1 R4 50 1
cr b3t10-1 R8 50 4
cr b3t10-1 R10 50 1
cr b4t10-1 R1 50 1
cr b4t10-1 R3 50 6
cr b4t10-1 R4 50 1
cr b4t10-1 R8 50 4
cr b4t10-1 R10 50 1
cr b5t10-1 R1 50 1
cr b5t10-1 R3 50 6
cr b5t10-1 R4 50 1
cr b5t10-1 R8 50 4
cr b5t10-1 R10 50 1

JUST FOR STATISTICS

Total Number of resources ---- >10

Total Number of events --->52

Total number of constraints on events --->59

Total Number of Resource constraints ----> 274

```
// This file indicates the allocation of resources for individual events and
// their satisfaction in the schedule.
// Further it indicates the complaints if there are any conflicts in resources
```

Events *****

Appendix B-5
Resource Allocation Output for the Army Battalion Test Case Using the Genetic Algorithm Approach

b1t1-1	127
R1	
R3	
R5	
R6	
R9	
b1t1-2	127
R1	
R3	
R5	
R6	
R9	
b1t10-1	127
R1	
R3	
R4	
R8	
R10	
b1t2-1	127
R1	
R2	
R3	
R4	
R6	
R10	
b1t3-1	127
R2	
R3	
R5	
R6	
R7	
R8	
b1t3-2	127
R2	
R3	
R5	
R6	
R7	
R8	
b1t4-1	127
R3	
R4	
R5	
R6	
R7	
R8	
R10	
b1t4-2	127
R3	
R4	
R5	
R6	
R7	
R8	
R10	
b1t4-3	127
R3	

R4
R5
R6
R7
R8
R10
b1t7-1 127
R1
R2
R5
R6
R8
b1t9-1 117
R3
R4
R5
R7
R9
R10
b2t2-1 127
R1
R2
R3
R4
R6
R10
b2t2-2 127
R1
R2
R3
R4
R6
R10
b2t3-1 127
R2
R3
R5
R6
R7
R8
b2t4-1 127
R3
R4
R5
R6
R7
R8
R10
b2t4-2 127
R3
R4
R5
R6
R7
R8
R10
b2t6-1 127
R4
R5
R7
R8
b2t6-2 127
R4

R5
R7
R8
b2t6-3 127
R4
R5
R7
R8
b2t9-1 127
R3
R4
R5
R7
R9
R10
b3t1-1 127
R1
R3
R5
R6
R9
b3t10-1 127
R1
R3
R4
R8
R10
b3t3-1 127
R2
R3
R5
R6
R7
R8
b3t4-1 127
R3
R4
R5
R6
R7
R8
R10
b3t4-2 127
R3
R4
R5
R6
R7
R8
R10
b3t5-1 117
R1
R4
R6
R7
R8
R9
b3t6-1 127
R4
R5
R7
R8
b3t6-2 127

R4
R5
R7
R8
b3t6-3 127
R4
R5
R7
R8
b3t6-4 127
R4
R5
R7
R8
b3t8-1 127
R2
R3
R7
R10
b3t8-2 127
R2
R3
R7
R10
b4t10-1 127
R1
R3
R4
R8
R10
b4t2-1 127
R1
R2
R3
R4
R6
R10
b4t2-2 127
R1
R2
R3
R4
R6
R10
b4t2-3 127
R1
R2
R3
R4
R6
R10
b4t4-1 127
R3
R4
R5
R6
R7
R8
R10
b4t6-1 127
R4
R5
R7

R8
b4t7-1 127
R1
R2
R5
R6
R8
b4t8-1 127
R2
R3
R7
R10
b5t1-1 127
R1
R3
R5
R6
R9
b5t10-1 127
R1
R3
R4
R8
R10
b5t3-1 127
R2
R3
R5
R6
R7
R8
b5t3-2 127
R2
R3
R5
R6
R7
R8
b5t4-1 127
R3
R4
R5
R6
R7
R8
R10
b5t5-1 127
R1
R4
R6
R7
R8
R9
b5t6-1 127
R4
R5
R7
R8
b5t6-2 127
R4
R5
R7
R8

b5t6-3 127

R4

R5

R7

R8

b5t6-4 127

R4

R5

R7

R8

b5t7-1 127

R1

R2

R5

R6

R8

ew 0

Resources*****

R1 B 7

b1t1-1 4 7 2

b1t1-2 23 26 2

b3t1-1 4 7 2

b5t1-1 1 4 2

b1t2-1 4 6 6

b2t2-1 1 3 6

b2t2-2 13 15 6

b4t2-1 2 4 6

b4t2-2 19 21 6

b4t2-3 17 19 6

b3t5-1 40 44 3

b5t5-1 40 44 3

b1t7-1 39 43 5

b4t7-1 37 41 5

b5t7-1 29 33 5

b1t10-1 34 38 1

b3t10-1 32 36 1

b4t10-1 28 32 1

b5t10-1 33 37 1

R2 B 7

b1t2-1 4 6 4

b2t2-1 1 3 4

b2t2-2 13 15 4

b4t2-1 2 4 4

b4t2-2 19 21 4

b4t2-3 17 19 4

b1t3-1 9 12 1

b1t3-2 19 22 1

b2t3-1 2 5 1

b3t3-1 1 4 1

b5t3-1 1 4 1

b5t3-2 19 22 1

b1t7-1 39 43 2

b4t7-1 37 41 2

b5t7-1 29 33 2

b3t8-1 14 17 1

b3t8-2 26 29 1

b4t8-1 10 13 1

R3 B 11

b1t1-1 4 7 2

b1t1-2 23 26 2

b3t1-1 4 7 2
b5t1-1 1 4 2
b1t2-1 4 6 3
b2t2-1 1 3 3
b2t2-2 13 15 3
b4t2-1 2 4 3
b4t2-2 19 21 3
b4t2-3 17 19 3
b1t3-1 9 12 4
b1t3-2 1 22 4
b2t3-1 2 5 4
b3t3-1 1 4 4
b5t3-1 1 4 4
b5t3-2 19 22 4
b1t4-1 9 11 5
b1t4-2 31 33 5
b1t4-3 29 31 5
b2t4-1 6 8 5
b2t4-2 15 17 5
b3t4-1 6 8 5
b3t4-2 21 23 5
b4t4-1 3 5 5
b5t4-1 6 8 5
b3t8-1 14 17 4
b3t8-2 26 29 4
b4t8-1 10 13 4
b1t9-1 15 19 5
b2t9-1 40 44 5
b1t10-1 34 38 6
b3t10-1 32 36 6
b4t10-1 28 32 6
b5t10-1 33 37 6

R4 B 11

b1t2-1 4 6 2
b2t2-1 1 3 2
b2t2-2 13 15 2
b4t2-1 2 4 2
b4t2-2 19 21 2
b4t2-3 17 19 2
b1t4-1 9 11 4
b1t4-2 31 33 4
b1t4-3 29 31 4
b2t4-1 6 8 4
b2t4-2 15 17 4
b3t4-1 6 8 4
b3t4-2 21 23 4
b4t4-1 3 5 4
b5t4-1 6 8 4
b3t5-1 40 44 2
b5t5-1 40 44 2
b2t6-1 8 9 3
b2t6-2 18 19 3
b2t6-3 17 18 3
b3t6-1 13 14 3
b3t6-2 25 26 3
b3t6-3 24 25 3
b3t6-4 23 24 3
b4t6-1 5 6 3
b5t6-1 12 13 3
b5t6-2 27 28 3
b5t6-3 26 27 3
b5t6-4 22 23 3
b1t9-1 15 19 3

b2t9-1 40 44 3
b1t10-1 34 38 1
b3t10-1 32 36 1
b4t10-1 28 32 1
b5t10-1 33 37 1

R5 B 8

b1t1-1 4 7 4
b1t1-2 23 26 4
b3t1-1 4 7 4
b5t1-1 1 4 4
b1t3-1 9 12 1
b1t3-2 19 22 1
b2t3-1 2 5 1
b3t3-1 1 4 1
b5t3-1 1 4 1
b5t3-2 19 22 1
b1t4-1 9 11 1
b1t4-2 31 33 1
b1t4-3 29 31 1
b2t4-1 6 8 1
b2t4-2 15 17 1
b3t4-1 6 8 1
b3t4-2 21 23 1
b4t4-1 3 5 1
b5t4-1 6 8 1
b2t6-1 8 9 2
b2t6-2 18 19 2
b2t6-3 17 18 2
b3t6-1 13 14 2
b3t6-2 25 26 2
b3t6-3 24 25 2
b3t6-4 23 24 2
b4t6-1 5 6 2
b5t6-1 12 13 2
b5t6-2 27 28 2
b5t6-3 26 27 2
b5t6-4 22 23 2
b1t7-1 39 43 4
b4t7-1 37 41 4
b5t7-1 29 33 4
b1t9-1 15 19 1
b2t9-1 40 44 1

R6 B 13

b1t1-1 4 7 7
b1t1-2 23 26 7
b3t1-1 4 7 7
b5t1-1 1 4 7
b1t2-1 4 6 3
b2t2-1 1 3 3
b2t2-2 13 15 3
b4t2-1 2 4 3
b4t2-2 19 21 3
b4t2-3 17 19 3
b1t3-1 9 12 2
b1t3-2 19 22 2
b2t3-1 2 5 2
b3t3-1 1 4 2
b5t3-1 1 4 2
b5t3-2 19 22 2
b1t4-1 9 11 4
b1t4-2 31 33 4
b1t4-3 29 31 4
b2t4-1 6 8 4

b2t4-2 15 17 4
b3t4-1 6 8 4
b3t4-2 21 23 4
b4t4-1 3 5 4
b5t4-1 6 8 4
b3t5-1 40 44 6
b5t5-1 40 44 6
b1t7-1 39 43 2
b4t7-1 37 41 2
b5t7-1 29 33 2

R7 B 6

b1t3-1 9 12 1
b1t3-2 19 22 1
b2t3-1 2 5 1
b3t3-1 1 4 1
b5t3-1 1 4 1
b5t3-2 19 22 1
b1t4-1 9 11 1
b1t4-2 31 33 1
b1t4-3 29 31 1
b2t4-1 6 8 1
b2t4-2 15 17 1
b3t4-1 6 8 1
b3t4-2 21 23 1
b4t4-1 3 5 1
b5t4-1 6 8 1
b3t5-1 40 44 1
b5t5-1 40 44 1
b2t6-1 8 9 1
b2t6-2 18 19 1
b2t6-3 17 18 1
b3t6-1 13 14 1
b3t6-2 25 26 1
b3t6-3 24 25 1
b3t6-4 23 24 1
b4t6-1 5 6 1
b5t6-1 12 13 1
b5t6-2 27 28 1
b5t6-3 26 27 1
b5t6-4 22 23 1
b3t8-1 14 17 2
b3t8-2 26 29 2
b4t8-1 10 13 2
b1t9-1 15 19 2
b2t9-1 40 44 2

R8 B 7

b1t3-1 9 12 2
b1t3-2 19 22 2
b2t3-1 2 5 2
b3t3-1 1 4 2
b5t3-1 1 4 2
b5t3-2 19 22 2
b1t4-1 9 11 4
b1t4-2 31 33 4
b1t4-3 29 31 4
b2t4-1 6 8 4
b2t4-2 15 17 4
b3t4-1 6 8 4
b3t4-2 21 23 4
b4t4-1 3 5 4
b5t4-1 6 8 4
b3t5-1 40 44 3
b5t5-1 40 44 3

b2t6-1 8 9 4
b2t6-2 18 19 4
b2t6-3 17 18 4
b3t6-1 13 14 4
b3t6-2 25 26 4
b3t6-3 24 25 4
b3t6-4 23 24 4
b4t6-1 5 6 4
b5t6-1 12 13 4
b5t6-2 27 28 4
b5t6-3 26 27 4
b5t6-4 22 23 4
b1t7-1 39 43 2
b4t7-1 37 41 2
b5t7-1 29 33 2
b1t10-1 34 38 4
b3t10-1 32 36 4
b4t10-1 28 32 4
b5t10-1 33 37 4

R9 B 9

b1t1-1 4 7 3
b1t1-2 23 26 3
b3t1-1 4 7 3
b5t1-1 1 4 3
b3t5-1 40 44 2
b5t5-1 40 44 2
b1t9-1 15 19 3
b2t9-1 40 44 3

R10 B 7

b1t2-1 4 6 1
b2t2-1 1 3 1
b2t2-2 13 15 1
b4t2-1 2 4 1
b4t2-2 19 21 1
b4t2-3 17 19 1
b1t4-1 9 11 4
b1t4-2 31 33 4
b1t4-3 29 31 4
b2t4-1 6 8 4
b2t4-2 15 17 4
b3t4-1 6 8 4
b3t4-2 21 23 4
b4t4-1 3 5 4
b5t4-1 6 8 4
b3t8-1 14 17 2
b3t8-2 26 29 2
b4t8-1 10 13 2
b1t9-1 15 19 1
b2t9-1 40 44 1
b1t10-1 34 38 1
b3t10-1 32 36 1
b4t10-1 28 32 1
b5t10-1 33 37 1

Appendix B-6

Scheduling Output for the Army Battalion Test Case Using the Genetic Algorithm Approach

RB R1 7
RB R2 7
RB R3 11
RB R4 11
RB R5 8
RB R6 13
RB R7 6
RB R8 7
RB R9 9
RB R10 7
eBase ew 1 365 10
eBase b5t7-1 29 33 10
cDuring con 50 b5t7-1 ew
CR b5t7-1 R1 100 5
CR b5t7-1 R2 100 2
CR b5t7-1 R5 100 4
CR b5t7-1 R6 100 2
CR b5t7-1 R8 100 2
eBase b5t6-4 22 23 10
cDuring con 50 b5t6-4 ew
CR b5t6-4 R4 100 3
CR b5t6-4 R5 100 2
CR b5t6-4 R7 100 1
CR b5t6-4 R8 100 4
eBase b5t6-3 26 27 10
cDuring con 50 b5t6-3 ew
CR b5t6-3 R4 100 3
CR b5t6-3 R5 100 2
CR b5t6-3 R7 100 1
CR b5t6-3 R8 100 4
eBase b5t6-2 27 28 10
cDuring con 50 b5t6-2 ew
CR b5t6-2 R4 100 3
CR b5t6-2 R5 100 2
CR b5t6-2 R7 100 1
CR b5t6-2 R8 100 4
eBase b5t6-1 12 13 10
cDuring con 50 b5t6-1 ew
CR b5t6-1 R4 100 3
CR b5t6-1 R5 100 2
CR b5t6-1 R7 100 1
CR b5t6-1 R8 100 4
eBase b5t5-1 40 44 10
cDuring con 50 b5t5-1 ew
cAfter con 50 b5t5-1 b5t10-1
cDuring con 50 b5t5-1 b2t9-1
CR b5t5-1 R1 100 3
CR b5t5-1 R4 100 2
CR b5t5-1 R6 100 6
CR b5t5-1 R7 100 1
CR b5t5-1 R8 100 3
CR b5t5-1 R9 100 2
eBase b5t4-1 6 8 10
cDuring con 50 b5t4-1 ew
CR b5t4-1 R3 100 5
CR b5t4-1 R4 100 4
CR b5t4-1 R5 100 1
CR b5t4-1 R6 100 4
CR b5t4-1 R7 100 1
CR b5t4-1 R8 100 4
CR b5t4-1 R10 100 4
eBase b5t3-2 19 22 10
cDuring con 50 b5t3-2 ew

CR b5t3-2 R2 100 1
CR b5t3-2 R3 100 4
CR b5t3-2 R5 100 1
CR b5t3-2 R6 100 2
CR b5t3-2 R7 100 1
CR b5t3-2 R8 100 2
eBase b5t3-1 1 4 10
cDuring con 50 b5t3-1 ew
CR b5t3-1 R2 100 1
CR b5t3-1 R3 100 4
CR b5t3-1 R5 100 1
CR b5t3-1 R6 100 2
CR b5t3-1 R7 100 1
CR b5t3-1 R8 100 2
eBase b5t10-1 33 37 10
cDuring con 50 b5t10-1 ew
cBefor con 50 b5t10-1 b5t5-1
CR b5t10-1 R1 100 1
CR b5t10-1 R3 100 6
CR b5t10-1 R4 100 1
CR b5t10-1 R8 100 4
CR b5t10-1 R10 100 1
eBase b5t1-1 1 4 10
cDuring con 50 b5t1-1 ew
CR b5t1-1 R1 100 2
CR b5t1-1 R3 100 2
CR b5t1-1 R5 100 4
CR b5t1-1 R6 100 7
CR b5t1-1 R9 100 3
eBase b4t8-1 10 13 10
cDuring con 50 b4t8-1 ew
CR b4t8-1 R2 100 1
CR b4t8-1 R3 100 4
CR b4t8-1 R7 100 2
CR b4t8-1 R10 100 2
eBase b4t7-1 37 41 10
cDuring con 50 b4t7-1 ew
CR b4t7-1 R1 100 5
CR b4t7-1 R2 100 2
CR b4t7-1 R5 100 4
CR b4t7-1 R6 100 2
CR b4t7-1 R8 100 2
eBase b4t6-1 5 6 10
cDuring con 50 b4t6-1 ew
CR b4t6-1 R4 100 3
CR b4t6-1 R5 100 2
CR b4t6-1 R7 100 1
CR b4t6-1 R8 100 4
eBase b4t4-1 3 5 10
cDuring con 50 b4t4-1 ew
CR b4t4-1 R3 100 5
CR b4t4-1 R4 100 4
CR b4t4-1 R5 100 1
CR b4t4-1 R6 100 4
CR b4t4-1 R7 100 1
CR b4t4-1 R8 100 4
CR b4t4-1 R10 100 4
eBase b4t2-3 17 19 10
cDuring con 50 b4t2-3 ew
CR b4t2-3 R1 100 6
CR b4t2-3 R2 100 4
CR b4t2-3 R3 100 3
CR b4t2-3 R4 100 2

CR b4t2-3 R6 100 3
CR b4t2-3 R10 100 1
eBase b4t2-2 19 21 10
cDuring con 50 b4t2-2 ew
CR b4t2-2 R1 100 6
CR b4t2-2 R2 100 4
CR b4t2-2 R3 100 3
CR b4t2-2 R4 100 2
CR b4t2-2 R6 100 3
CR b4t2-2 R10 100 1
eBase b4t2-1 2 4 10
cDuring con 50 b4t2-1 ew
CR b4t2-1 R1 100 6
CR b4t2-1 R2 100 4
CR b4t2-1 R3 100 3
CR b4t2-1 R4 100 2
CR b4t2-1 R6 100 3
CR b4t2-1 R10 100 1
eBase b4t10-1 28 32 10
cDuring con 50 b4t10-1 ew
CR b4t10-1 R1 100 1
CR b4t10-1 R3 100 6
CR b4t10-1 R4 100 1
CR b4t10-1 R8 100 4
CR b4t10-1 R10 100 1
eBase b3t8-2 26 29 10
cDuring con 50 b3t8-2 ew
CR b3t8-2 R2 100 1
CR b3t8-2 R3 100 4
CR b3t8-2 R7 100 2
CR b3t8-2 R10 100 2
eBase b3t8-1 14 17 10
cDuring con 50 b3t8-1 ew
CR b3t8-1 R2 100 1
CR b3t8-1 R3 100 4
CR b3t8-1 R7 100 2
CR b3t8-1 R10 100 2
eBase b3t6-4 23 24 10
cDuring con 50 b3t6-4 ew
CR b3t6-4 R4 100 3
CR b3t6-4 R5 100 2
CR b3t6-4 R7 100 1
CR b3t6-4 R8 100 4
eBase b3t6-3 24 25 10
cDuring con 50 b3t6-3 ew
CR b3t6-3 R4 100 3
CR b3t6-3 R5 100 2
CR b3t6-3 R7 100 1
CR b3t6-3 R8 100 4
eBase b3t6-2 25 26 10
cDuring con 50 b3t6-2 ew
CR b3t6-2 R4 100 3
CR b3t6-2 R5 100 2
CR b3t6-2 R7 100 1
CR b3t6-2 R8 100 4
eBase b3t6-1 13 14 10
cDuring con 50 b3t6-1 ew
CR b3t6-1 R4 100 3
CR b3t6-1 R5 100 2
CR b3t6-1 R7 100 1
CR b3t6-1 R8 100 4
eBase b3t5-1 40 44 10
cDuring con 50 b3t5-1 ew

cAfter con 50 b3t5-1 b3t10-1
cDuring con 50 b3t5-1 b1t9-1
CR b3t5-1 R1 100 3
CR b3t5-1 R4 100 2
CR b3t5-1 R6 100 6
CR b3t5-1 R7 100 1
CR b3t5-1 R8 100 3
CR b3t5-1 R9 100 2
eBase b3t4-2 21 23 10
cDuring con 50 b3t4-2 ew
CR b3t4-2 R3 100 5
CR b3t4-2 R4 100 4
CR b3t4-2 R5 100 1
CR b3t4-2 R6 100 4
CR b3t4-2 R7 100 1
CR b3t4-2 R8 100 4
CR b3t4-2 R10 100 4
eBase b3t4-1 6 8 10
cDuring con 50 b3t4-1 ew
CR b3t4-1 R3 100 5
CR b3t4-1 R4 100 4
CR b3t4-1 R5 100 1
CR b3t4-1 R6 100 4
CR b3t4-1 R7 100 1
CR b3t4-1 R8 100 4
CR b3t4-1 R10 100 4
eBase b3t3-1 1 4 10
cDuring con 50 b3t3-1 ew
CR b3t3-1 R2 100 1
CR b3t3-1 R3 100 4
CR b3t3-1 R5 100 1
CR b3t3-1 R6 100 2
CR b3t3-1 R7 100 1
CR b3t3-1 R8 100 2
eBase b3t10-1 32 36 10
cDuring con 50 b3t10-1 ew
cBefor con 50 b3t10-1 b3t5-1
CR b3t10-1 R1 100 1
CR b3t10-1 R3 100 6
CR b3t10-1 R4 100 1
CR b3t10-1 R8 100 4
CR b3t10-1 R10 100 1
eBase b3t1-1 4 7 10
cDuring con 50 b3t1-1 ew
CR b3t1-1 R1 100 2
CR b3t1-1 R3 100 2
CR b3t1-1 R5 100 4
CR b3t1-1 R6 100 7
CR b3t1-1 R9 100 3
eBase b2t9-1 40 44 10
cDuring con 50 b2t9-1 ew
cDuring con 50 b2t9-1 b5t5-1
CR b2t9-1 R3 100 5
CR b2t9-1 R4 100 3
CR b2t9-1 R5 100 1
CR b2t9-1 R7 100 2
CR b2t9-1 R9 100 3
CR b2t9-1 R10 100 1
eBase b2t6-3 17 18 10
cDuring con 50 b2t6-3 ew
CR b2t6-3 R4 100 3
CR b2t6-3 R5 100 2
CR b2t6-3 R7 100 1

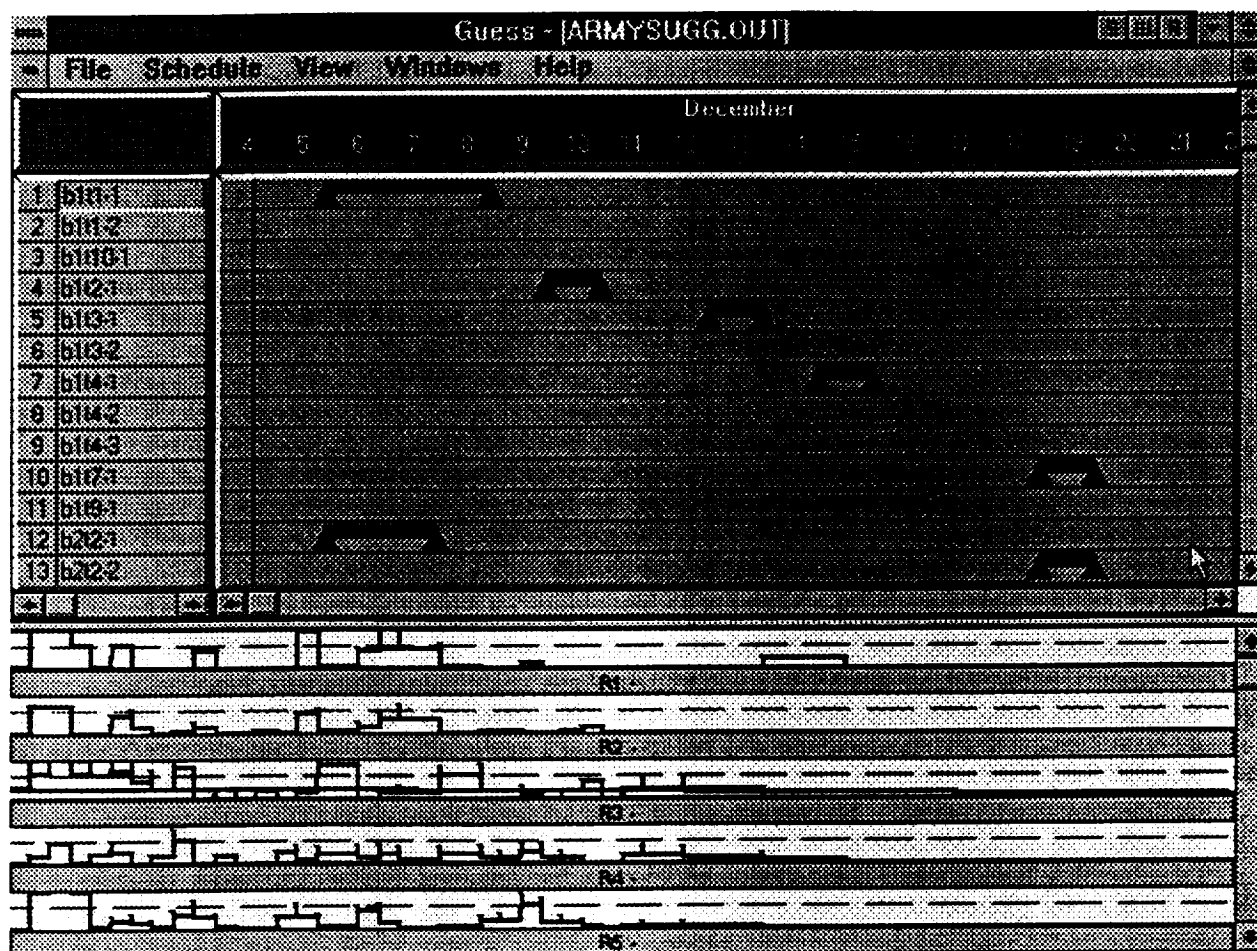
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eBase b2t6-2 18 19 10
cDuring con 50 b2t6-2 ew
CR b2t6-2 R4 100 3
CR b2t6-2 R5 100 2
CR b2t6-2 R7 100 1
CR b2t6-2 R8 100 4
eBase b2t6-1 8 9 10
cDuring con 50 b2t6-1 ew
CR b2t6-1 R4 100 3
CR b2t6-1 R5 100 2
CR b2t6-1 R7 100 1
CR b2t6-1 R8 100 4
eBase b2t4-2 15 17 10
cDuring con 50 b2t4-2 ew
CR b2t4-2 R3 100 5
CR b2t4-2 R4 100 4
CR b2t4-2 R5 100 1
CR b2t4-2 R6 100 4
CR b2t4-2 R7 100 1
CR b2t4-2 R8 100 4
CR b2t4-2 R10 100 4
eBase b2t4-1 6 8 10
cDuring con 50 b2t4-1 ew
CR b2t4-1 R3 100 5
CR b2t4-1 R4 100 4
CR b2t4-1 R5 100 1
CR b2t4-1 R6 100 4
CR b2t4-1 R7 100 1
CR b2t4-1 R8 100 4
CR b2t4-1 R10 100 4
eBase b2t3-1 2 5 10
cDuring con 50 b2t3-1 ew
CR b2t3-1 R2 100 1
CR b2t3-1 R3 100 4
CR b2t3-1 R5 100 1
CR b2t3-1 R6 100 2
CR b2t3-1 R7 100 1
CR b2t3-1 R8 100 2
eBase b2t2-2 13 15 10
cDuring con 50 b2t2-2 ew
CR b2t2-2 R1 100 6
CR b2t2-2 R2 100 4
CR b2t2-2 R3 100 3
CR b2t2-2 R4 100 2
CR b2t2-2 R6 100 3
CR b2t2-2 R10 100 1
eBase b2t2-1 1 3 10
cDuring con 50 b2t2-1 ew
CR b2t2-1 R1 100 6
CR b2t2-1 R2 100 4
CR b2t2-1 R3 100 3
CR b2t2-1 R4 100 2
CR b2t2-1 R6 100 3
CR b2t2-1 R10 100 1
eBase b1t9-1 15 19 10
cDuring con 50 b1t9-1 ew
cDuring con 50 b1t9-1 b3t5-1
CR b1t9-1 R3 100 5
CR b1t9-1 R4 100 3
CR b1t9-1 R5 100 1
CR b1t9-1 R7 100 2
CR b1t9-1 R9 100 3

CR b1t9-1 R10 100 1
eBase b1t7-1 39 43 10
cDuring con 50 b1t7-1 ew
CR b1t7-1 R1 100 5
CR b1t7-1 R2 100 2
CR b1t7-1 R5 100 4
CR b1t7-1 R6 100 2
CR b1t7-1 R8 100 2
eBase b1t4-3 29 31 10
cDuring con 50 b1t4-3 ew
CR b1t4-3 R3 100 5
CR b1t4-3 R4 100 4
CR b1t4-3 R5 100 1
CR b1t4-3 R6 100 4
CR b1t4-3 R7 100 1
CR b1t4-3 R8 100 4
CR b1t4-3 R10 100 4
eBase b1t4-2 31 33 10
cDuring con 50 b1t4-2 ew
CR b1t4-2 R3 100 5
CR b1t4-2 R4 100 4
CR b1t4-2 R5 100 1
CR b1t4-2 R6 100 4
CR b1t4-2 R7 100 1
CR b1t4-2 R8 100 4
CR b1t4-2 R10 100 4
eBase b1t4-1 9 11 10
cDuring con 50 b1t4-1 ew
CR b1t4-1 R3 100 5
CR b1t4-1 R4 100 4
CR b1t4-1 R5 100 1
CR b1t4-1 R6 100 4
CR b1t4-1 R7 100 1
CR b1t4-1 R8 100 4
CR b1t4-1 R10 100 4
eBase b1t3-2 19 22 10
cDuring con 50 b1t3-2 ew
CR b1t3-2 R2 100 1
CR b1t3-2 R3 100 4
CR b1t3-2 R5 100 1
CR b1t3-2 R6 100 2
CR b1t3-2 R7 100 1
CR b1t3-2 R8 100 2
eBase b1t3-1 9 12 10
cDuring con 50 b1t3-1 ew
CR b1t3-1 R2 100 1
CR b1t3-1 R3 100 4
CR b1t3-1 R5 100 1
CR b1t3-1 R6 100 2
CR b1t3-1 R7 100 1
CR b1t3-1 R8 100 2
eBase b1t2-1 4 6 10
cDuring con 50 b1t2-1 ew
CR b1t2-1 R1 100 6
CR b1t2-1 R2 100 4
CR b1t2-1 R3 100 3
CR b1t2-1 R4 100 2
CR b1t2-1 R6 100 3
CR b1t2-1 R10 100 1
eBase b1t10-1 34 38 10
cDuring con 50 b1t10-1 ew
CR b1t10-1 R1 100 1
CR b1t10-1 R3 100 6

CR b1t10-1 R4 1
CR b1t10-1 R8 10
CR b1t10-1 R10 100 1
eBase b1t1-2 23 26 10
cDuring con 50 b1t1-2 ew
CR b1t1-2 R1 100 2
CR b1t1-2 R3 100
CR b1t1-2 R5 10
CR b1t1-2 R6 100 7
CR b1t1-2 R9 100 3
eBase b1t1-1 4 7 10
cDuring con 50 b1t1-1 ew
CR b1t1-1 R1 100 2
CR b1t1-1 R3 100
CR b1t1-1 R5 100 4
CR b1t1-1 R6 100 7
CR b1t1-1 R9 100 3

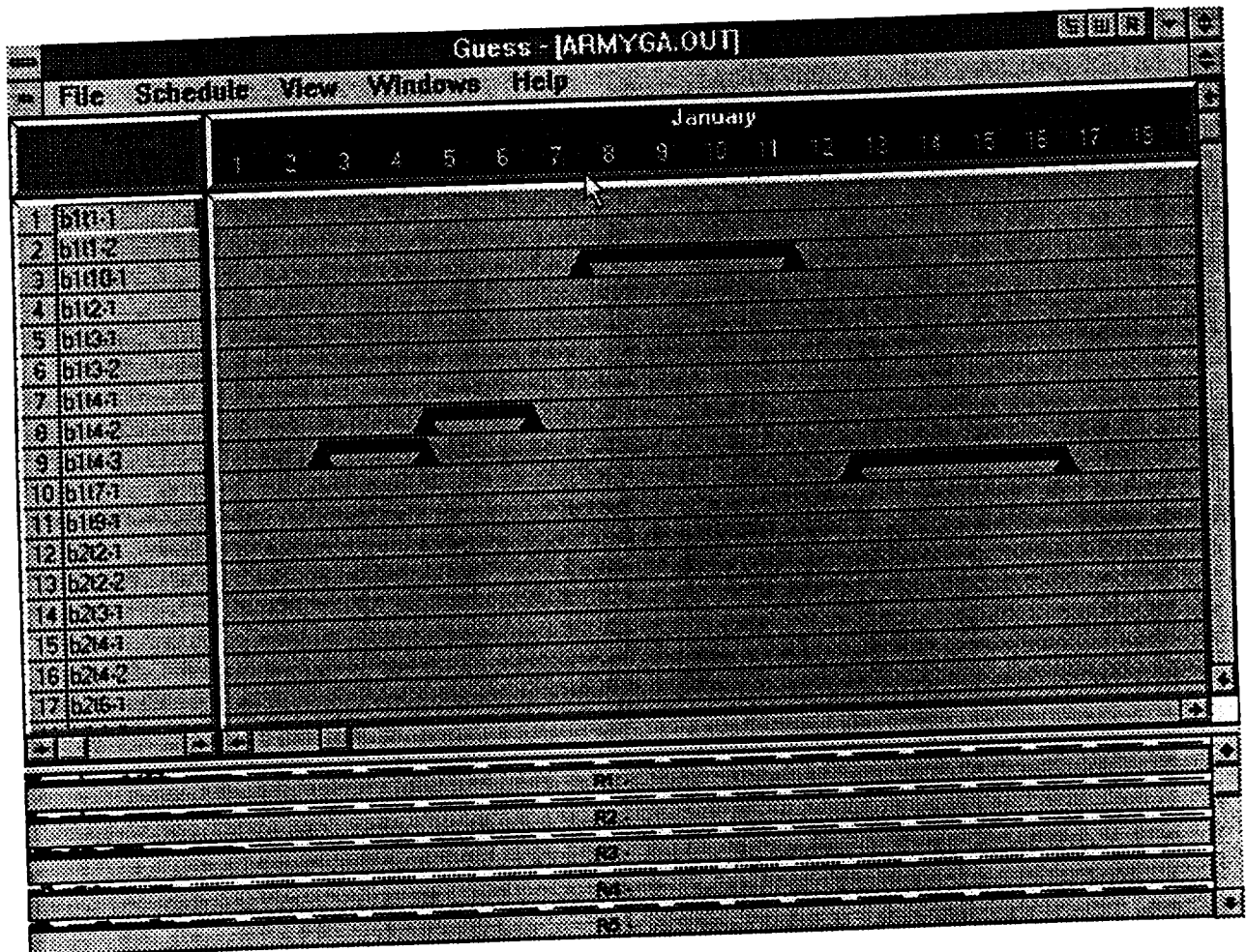
Appendix B-7

Sample GUESS Screen Output for the Army Battalion Test Case Using the Suggestion Tabulator



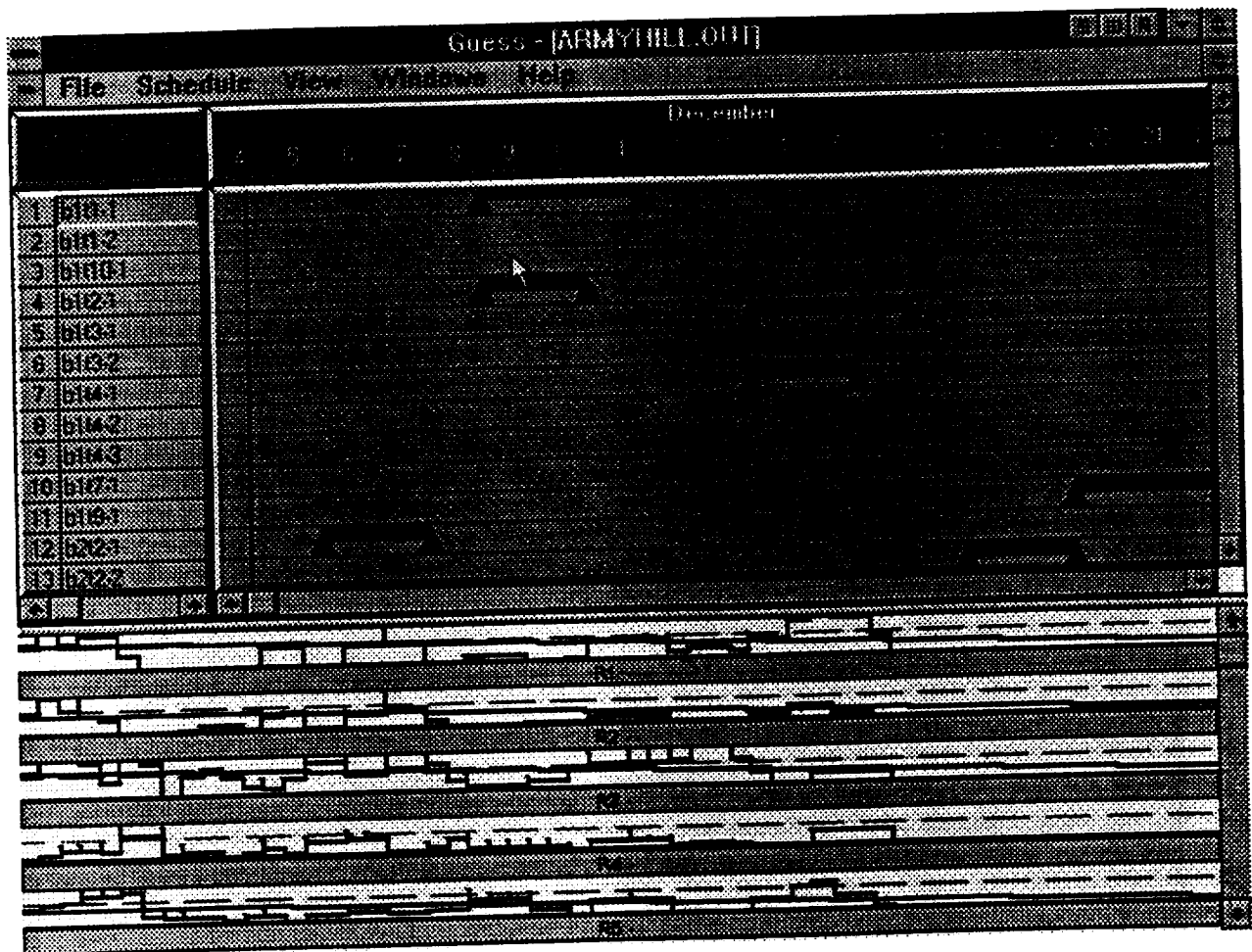
Appendix B-8

Sample GUESS Screen Output for the Army Battalion Test Case Using the Genetic Algorithm Approach



Appendix B-9

Sample GUESS Screen Output for the Army Battalion Test Case Using the Hill Climbing Algorithm



Input File

EL World 0 60 10

EL E1 0 1 5

EL E2 0 5 5

EL E3 0 10 5

EL E4 0 30 5

NOTIFICATION OF MOBILIZATION (N-DAY)

N+5

N+10

N+30

CS CON 100 E2 E1

CS CON 100 E3 E1

CS CON 100 E4 E1

CS CON 100 E2 E1

CS CON 100 E3 E1

CS CON 100 E2 E1

CS CON 100 E3 E1

CS CON 100 E4 E1

CS CON 100 E4 E1

Appendix C-1

Input File for Scheduling the Arrival of Military Units in a Deployed Theater

EB E5 0 1 5

CD con 50 E5 World

EB E6 0 1 5

CD con 50 E6 World

EB E7 0 1 5

CD con 50 E7 World

EB E8 0 1 5

CD con 50 E8 World

MOBILIZE AIRLIFT

MOBILIZE SEALIFT

MOBILIZE CRAF PHASE I

BEGIN PHASE II OF CRAF

CA CON 50 E5 E1 MOBILIZE AIRLIFT AFTER N-DAY

CB CON 50 E1 E5 MOBILIZE AIRLIFT AFTER N-DAY

CA CON 50 E6 E1 MOBILIZE SEALIFT AFTER N-DAY

CB CON 50 E1 E6 MOBILIZE SEALIFT AFTER N-DAY

CA CON 50 E7 E1 MOBILIZE CRAF, PHASE I, AFTER N-DAY

CB CON 50 E1 E7 MOBILIZE CRAF, PHASE I, AFTER N-DAY

CA CON 50 E8 E4 BEGIN PHASE II OF CRAF @ N+30

CB CON 50 E4 E8 BEGIN PHASE II OF CRAF @ N+30

RD C141 210

RD C5 100

RD C17 20

RD CRAF 30

RD PAX 34

210 C-141 CARGO PLANES @ 45 TONS EACH

100 C-5 CARGO PLANES @ 101 TONS EACH

20 C-17 CARGO PLANES @ 86 TONS EACH

30 CRAF CARGO PLANES @ 70 TONS EACH

34 C-141 PAX PLANES @ 200 EACH

CR E7 PAX 1000 -18

CR E8 PAX 1000 -67

CR E8 CRAF 1000 -19

EACH

CRAF I, ADDS 18 PAX PLANES @ 200 EACH

CRAF II, ADDS 67 PAX PLANES @ 200 EACH

CRAF II, ADDS 19 CARGO PLANES @ 70 TONS

Input File

RD RRFFAST 0 NO FAST SEALIFT SHIPS AVAIL @ N-DAY
RD RRFCARGO 0 NO RRF CARGO SHIPS AVAIL @ N-DAY
RD RORO 0 NO RO-RO SHIPS AVAIL @ N-DAY
RD DRYCARGO 0 NO DRY CARGO SHIPS AVAIL @ N-DAY
RD TANKER 0 NO TANKER SHIPS AVAIL @ N-DAY

EB E9 0 1 5 FAST SEALIFT SHIPS AVAIL
CD con 50 E9 World
CA CON 50 E9 E2 FAST SEALIFT AVAIL @ N+5
CB CON 50 E2 E9 FAST SEALIFT AVAIL @ N+5
CR E9 RRFFAST 1000 -13 13 CARGO SHIPS @ 20.3K TONS, 30 KTS

EB E10 0 1 5 RRF CARGO SHIPS AVAIL
CD con 50 E10 World
CA CON 50 E10 E3 RRF CARGO AVAIL @ N+10
CB CON 50 E3 E10 RRF CARGO AVAIL @ N+10
CR E10 RRFCARGO 1000 -45 45 CARGO SHIPS AVAIL @ 11.2K TONS, 17.3 KTS

EB E11 0 1 5 RRF RO-RO SHIPS AVAIL
CD con 50 E11 World
CA CON 50 E11 E3 RRF RO-RO AVAIL @ N+10
CB CON 50 E3 E11 RRF RO-RO AVAIL @ N+10
CR E11 RORO 1000 -13 13 RO-RO SHIPS @ 15.3K TONS, 19.5 KTS

EB E12 0 1 5 MSC RO-RO SHIPS AVAIL
CD con 50 E12 World
CA CON 50 E12 E4 MSC RO-RO AVAIL @ N+30
CB CON 50 E4 E12 MSC RO-RO AVAIL @ N+30
CR E12 RORO 1000 -4 4 MORE RO-RO SHIPS @ 15.3K TONS, 19.5 KTS

EB E13 0 1 5 US FLAG RO-RO SHIPS AVAIL
CD con 50 E13 World
CA CON 50 E13 E4 US FLAG RO-RO AVAIL @ N+30
CB CON 50 E4 E13 US FLAG RO-RO AVAIL @ N+30
CR E13 RORO 1000 -4 4 MORE RO-RO SHIPS @ 15.3K TONS, 19.5 KTS

EB E14 0 1 5 MSC DRY CARGO SHIPS AVAIL
CD con 50 E14 World
CA CON 50 E14 E4 MSC DRY CARGO AVAIL @ N+30
CB CON 50 E4 E14 MSC DRY CARGO AVAIL @ N+30
CR E14 DRYCARGO 1000 -6 6 DRY CARGO SHIPS @ 21K TONS, 20 KTS

EB E15 0 1 5 US FLAG DRY CARGO SHIPS AVAIL

Input File

CD con 50 E15 World
CA CON 50 E15 E4 US FLAG DRY CARGO AVAIL @ N+30
CB CON 50 E4 E15 US FLAG DRY CARGO AVAIL @ N+30
CR E15 DRYCARGO 1000 -24 24 MORE DRY CARGO SHIPS @ 21K TONS, 20 KTS

EB E16 0 1 5 RRF TANKERS AVAIL
CD con 50 E16 World
CA CON 50 E16 E3 RRF TANKERS AVAIL @ N+10
CB CON 50 E3 E16 RRF TANKERS AVAIL @ N+10
CR E16 TANKER 1000 -10 10 TANKERS AVAIL @ 27.5K GAL, 20 KTS

EB E17 0 1 5 MSC TANKERS AVAIL
CD con 50 E17 World
CA CON 50 E17 E4 MSC TANKERS AVAIL @ N+30
CB CON 50 E4 E17 MSC TANKERS AVAIL @ N+30
CR E17 TANKER 1000 -15 15 MORE TANKERS AVAIL @ 27.5K GAL, 20 KTS

EB E18 0 1 5 US FLAG TANKERS AVAIL
CD con 50 E18 World
CA CON 50 E18 E4 US FLAG TANKER AVAIL @ N+30
CB CON 50 E4 E18 US FLAG TANKER AVAIL @ N+30
CR E18 TANKER 1000 -33 33 MORE TANKERS AVAIL @ 27.5K GAL, 20 KTS

RD AMMO 120000 120K TONS AMMO ON SITE @ N-DAY
RD POL 83330 83.33K GAL POL ON SITE @ N-DAY
RD OTHER 149000 149K TONS OTHER SUPPLIES ON SITE @ N-DAY

RD PAXEAST 0 PAX ON EAST COAST TO BE MOVED
RD EQUIPEAST 0 EQUIPMENT ON EAST COAST TO BE MOVED
RD PAXGULF 0 PAX ON GULF COAST TO BE MOVED
RD EQUIPGULF 0 EQUIPMENT ON GULF COAST TO BE MOVED
RD PAXWEST 0 PAX ON WEST COAST TO BE MOVED
RD EQUIPWEST 0 EQUIPMENT ON WEST COAST TO BE MOVED

EB E20 0 1 5 MOBILIZE BOMBER WING #2, EAST COAST, N+1
CD con 50 E20 World
CA CON 50 E20 E1 AFTER NOTIFICATION
CB CON 50 E1 E20 AFTER NOTIFICATION
CR E20 PAXEAST 1000 -3300 3300 PAX TO MOVE FROM EAST COAST
CR E20 EQUIPEAST 1000 -4000 4.0K TONS OF EQUIP TO MOVE FROM EAST COAST

Input File

EB E21 0 1 5 MOBILIZE BOMBER WING #3, GULF COAST, N+1
CD con 50 E21 World
CA CON 50 E21 E1 AFTER NOTIFICATION
CB CON 50 E1 E21 AFTER NOTIFICATION
CR E21 PAXGULF 1000 -3300 3300 PAX TO MOVE FROM EAST COAST
CR E21 EQUIPGULF 1000 -4000 4.0K TONS OF EQUIP TO MOVE FROM EAST
COAST

EB E22 0 1 5 MOBILIZE FIGHTER WING #2, WEST COAST, N+1
CD con 50 E22 World
CA CON 50 E22 E1 AFTER NOTIFICATION
CB CON 50 E1 E22 AFTER NOTIFICATION
CR E22 PAXWEST 1000 -3300 3300 PAX TO BE MOVED FROM WEST COAST
CR E22 EQUIPEAST 1000 -4000 3300 PAX TO MOVE FROM EAST COAST

EB E23 0 1 5 MOBILIZE FIGHTER WING #3, GULF COAST, N+1
CD con 50 E23 World
CA CON 50 E23 E1 AFTER NOTIFICATION
CB CON 50 E1 E23 AFTER NOTIFICATION
CR E23 PAXGULF 1000 -3300 ADD 3300 PAX TO MOVE FROM GULF COAST
CR E23 EQUIPGULF 1000 -4000 ADD 4.0K TONS OF EQUIP TO MOVE FROM
EAST COAST

EB E30 0 1 5 LOAD BOMBER WING #3, 1 DAY, GULF COAST, N+2
CD con 50 E30 World
CA CON 50 E30 E21 AFTER MOBILIZATION
CB CON 50 E21 E30 AFTER MOBILIZATION
CR E30 C5 1000 40 USE 40 C-5'S
CR E30 EQUIPGULF 1000 4000 TO MOVE BW3'S 4.0K TONS OF EQUIPMENT
CR E30 PAX 1000 17 USE 17 PAX PLANES
CR E30 PAXGULF 1000 3300 TO MOVE BW3'S 3300 PERSONNEL
EB E31 0 1 5 TRANSIT TIME TO KOREA, 1 DAY
CD con 50 E31 World
CA CON 50 E31 E30 AFTER LOAD
CB CON 50 E30 E31 AFTER LOAD
EB E32 0 1 5 UNLOAD BW3, 1 DAY, N+4
CD con 50 E32 World
CA CON 50 E32 E31 AFTER TRANSIT
CB CON 50 E31 E32 AFTER TRANSIT
EB E33 0 3 5 ASSEMBLE UNIT, 3 DAYS
CD con 50 E33 World
CA CON 50 E33 E32 AFTER UNLOAD
CB CON 50 E32 E33 AFTER UNLOAD
EB E34 0 1 5 BW3 EQUIPMENT AND PERSONNEL IN PLACE @ N+7
CD con 50 E34 World

Input File

CA CON 50 E34 E33 AFTER ASSEMBLE
CB CON 50 E33 E34 AFTER ASSEMBLE
EB E35 0 1 5 AIRCRAFT RETURN TRANSIT TO US, 1 DAY
CD con 50 E35 World
CA CON 5 E35 E32 AFTER UNLOAD
CB CON 5 E32 E35 AFTER UNLOAD
EB E36 0 1 5 AIRCRAFT AVAILABLE, N+5
CD con 50 E36 World
CA CON 5 E36 E35 AFTER TRANSIT
CB CON 5 E35 E36 AFTER TRANSIT
CR E36 C5 1000 -40 40 C-5 RETURNED TO THE POOL
CR E36 PAX 1000 -17 17 PAX PLANES RETURNED TO THE POOL

EB E40 0 1 5 LOAD FIGHTER WIND #3, 1 DAY, GULF COAST, N+2
CD con 50 E40 World
CA CON 50 E40 E23 AFTER MOBILIZATION
CB CON 50 E23 E40 AFTER MOBILIZATION
CR E40 C5 1000 40 USE 40 C-5'S
CR E40 EQUIPGULF 1000 4000 TO MOVE FW3'S 4.0K TONS OF EQUIPMENT
CR E40 PAX 1000 17 USE 17 PAX PLANES
CR E40 PAXGULF 1000 3300 TO MOVE FW3'S 3300 PERSONNEL
EB E41 0 1 5 TRANSIT TIME TO KOREA, 1 DAY
CD con 50 E41 World
CA CON 50 E41 E40 AFTER LOAD
CB CON 50 E40 E41 AFTER LOAD
EB E42 0 1 5 UNLOAD FW3, 1 DAY, N+4
CD con 50 E42 World
CA CON 50 E42 E41 AFTER TRANSIT
CB CON 50 E41 E42 AFTER TRANSIT
EB E43 0 3 5 ASSEMBLE UNIT, 3 DAYS
CD con 50 E43 World
CA CON 50 E43 E42 AFTER UNLOAD
CB CON 50 E42 E43 AFTER UNLOAD
EB E44 0 1 5 FW3 EQUIPMENT AND PERSONNEL IN PLACE @ N+7
CD con 50 E44 World
CA CON 50 E44 E43 AFTER ASSEMBLE
CB CON 50 E43 E44 AFTER ASSEMBLE
EB E45 0 1 5 AIRCRAFT RETURN TRANSIT TO US, 1 DAY
CD con 50 E45 World
CA CON 5 E45 E42 AFTER UNLOAD
CB CON 5 E42 E45 AFTER UNLOAD
EB E46 0 1 5 AIRCRAFT AVAILABLE, N+5
CD con 50 E46 World
CA CON 5 E46 E45 AFTER TRANSIT
CB CON 5 E45 E46 AFTER TRANSIT

Input File

CR E46 C5 1000 -40 40 C-5 RETURNED TO THE POOL
CR E46 PAX 1000 -17 17 PAX PLANES RETURNED TO THE POOL

EB E50 0 1 5 LOAD BOMBER WING #2, 1 DAY, EAST COAST, N+2
CD con 50 E50 World
CA CON 50 E50 E20 AFTER MOBILIZATION
CB CON 50 E20 E50 AFTER MOBILIZATION
CR E50 C5 1000 20 USE 20 C-5'S AND
CR E50 C141 1000 45 USE 45 C-141'S
CR E50 EQUIPEAST 1000 4000 TO MOVE BW2'S 4.0K TONS OF EQUIPMENT
CR E50 PAX 1000 17 USE 17 PAX PLANES
CR E50 PAXEAST 1000 3300 TO MOVE BW2'S 3300 PERSONNEL
EB E51 0 1 5 TRANSIT TIME TO KOREA, 1 DAY
CD con 50 E51 World
CA CON 50 E51 E50 AFTER LOAD
CB CON 50 E50 E51 AFTER LOAD
EB E52 0 1 5 UNLOAD BW2, 1 DAY, N+4
CD con 50 E52 World
CA CON 50 E52 E51 AFTER TRANSIT
CB CON 50 E51 E52 AFTER TRANSIT
EB E53 0 3 5 ASSEMBLE UNIT, 3 DAYS
CD con 50 E53 World
CA CON 50 E53 E52 AFTER UNLOAD
CB CON 50 E52 E53 AFTER UNLOAD
EB E54 0 1 5 BW2'S EQUIPMENT AND PERSONNEL IN PLACE @
N+7
CD con 50 E54 World
CA CON 50 E54 E53 AFTER ASSEMBLE
CB CON 50 E53 E54 AFTER ASSEMBLE
EB E55 0 1 5 AIRCRAFT RETURN TRANSIT TO US, 1 DAY
CD con 50 E55 World
CA CON 5 E55 E52 AFTER UNLOAD
CB CON 5 E52 E55 AFTER UNLOAD
EB E56 0 1 5 AIRCRAFT AVAILABLE, N+5
CD con 50 E56 World
CA CON 5 E56 E55 AFTER TRANSIT
CB CON 5 E55 E56 AFTER TRANSIT
CR E56 C5 1000 -20 20 C-5 RETURNED TO THE POOL
CR E56 C141 1000 -45 45 C-141 RETURNED TO THE POOL
CR E56 PAX 1000 -17 17 PAX PLANES RETURNED TO THE POOL

EB E60 0 4 5 WAIT FOR AIRCRAFT AVAILABILITY, 4 DAYS
CD con 50 E60 World
CA CON 50 E60 E22 AFTER MOBILIZATION
CB CON 50 E22 E60 AFTER MOBILIZATION

Input File

EB E61 0 1 5 LOAD FIGHTER WIND #2, 1 DAY, WEST COAST, N+6
CD con 50 E61 World
CA CON 50 E61 E60 AFTER WAIT
CB CON 50 E60 E61 AFTER WAIT
CR E61 C141 1000 89 USE 89 C-141'S
CR E61 EQUIPWEST 1000 4000 TO MOVE FW2'S 4.0K TONS OF EQUIPMENT
CR E61 PAX 1000 17 USE 17 PAX PLANES
CR E61 PAXWEST 1000 3300 TO MOVE FW2'S 3300 PERSONNEL
EB E62 0 1 5 TRANSIT TIME TO KOREA, 1 DAY
CD con 50 E62 World
CA CON 50 E62 E61 AFTER LOAD
CB CON 50 E61 E62 AFTER LOAD
EB E63 0 1 5 UNLOAD FW2, 1 DAY, N+8
CD con 50 E63 World
CA CON 50 E63 E62 AFTER TRANSIT
CB CON 50 E62 E63 AFTER TRANSIT
EB E64 0 3 5 ASSEMBLE UNIT, 3 DAYS
CD con 50 E64 World
CA CON 50 E64 E63 AFTER UNLOAD
CB CON 50 E63 E64 AFTER UNLOAD
EB E65 0 1 5 FW2 EQUIPMENT AND PERSONNEL IN PLACE @ N+11
CD con 50 E65 World
CA CON 50 E65 E64 AFTER ASSEMBLE
CB CON 50 E64 E65 AFTER ASSEMBLE
EB E66 0 1 5 AIRCRAFT RETURN TRANSIT TO US, 1 DAY
CD con 50 E66 World
CA CON 5 E66 E65 AFTER UNLOAD
CB CON 5 E65 E66 AFTER UNLOAD
EB E67 0 1 5 AIRCRAFT AVAILABLE, N+9
CD con 50 E67 World
CA CON 5 E67 E66 AFTER TRANSIT
CB CON 5 E66 E67 AFTER TRANSIT
CR E67 C141 1000 -89 89 C-141 RETURNED TO THE POOL
CR E67 PAX 1000 -17 17 PAX PLANES RETURNED TO THE POOL

EB E120 0 3 5 LOAD TANKERS, 3 DAYS
CD con 50 E120 World
CA CON 50 E120 E16 AFTER TANKERS ARE AVAIL @ N+10
CB CON 50 E16 E120 AFTER TANKERS ARE AVAIL @ N+10
CR E120 TANKER 1000 10 SEND ALL 10 TANKERS = 275K GAL POL
EB E121 0 11 5 IN TRANSIT, 11 DAYS, TO KOREA FROM WEST
COAST
CD con 50 E121 World
CA CON 50 E121 E120 AFTER LOADING
CB CON 50 E120 E121 AFTER LOADING

Input File

EB E122 0 3 5 ULOAD TANKERS, 3 DAYS

~~CD con 50 E122 World~~

~~CA CON 50 E122 E121 AFTER TRANSIT~~

~~CB CON 50 E121 E122 AFTER TRANSIT~~

EB E123 0 1 5 TANKER'S CARGO AVAIL DAY N+27

CD con 50 E123 World

CA CON 50 E123 E122 AFTER UNLOADING

CB CON 50 E122 E123 AFTER UNLOADING

CR E123 POL 1000 -275000 27.5K GALS/TANKER ADDED TO SUPPLY IN KOREA

EB E124 0 11 5 RETURN TRIP FOR TANKER, 11 DAYS

CD con 50 E124 World

CA CON 50 E124 E122 AFTER UNLOADING

CB CON 50 E122 E124 AFTER UNLOADING

EB E125 0 1 5 TANKER AVAIL

CD con 50 E125 World

CA CON 50 E125 E124 AFTER TRANSIT

CB CON 50 E124 E125 AFTER TRANSIT

CR E125 TANKER 1000 -10 RETURN 10 TANKERS TO POOL DAY N+38

EB E126 0 3 5 LOAD TANKERS FOR NEXT TRIP 3 DAYS

CD con 50 E126 World

CA CON 50 E126 E125 1ST 10 HAVE RETURN + 38 MORE SHOULD BE AVAIL

CB CON 50 E125 E126 1ST 10 HAVE RETURN + 38 MORE SHOULD BE AVAIL

CR E126 TANKER 1000 58 SEND ALL 58 TANKERS = 1595K GAL POL

EB E127 0 11 5 IN TRANSIT, 11 DAYS, TO KOREA FROM WEST COAST

CD con 50 E127 World

CA CON 50 E127 E126 AFTER LOADING

CB CON 50 E126 E127 AFTER LOADING

EB E128 0 3 5 ULOAD TANKERS, 3 DAYS

CD con 50 E128 World

CA CON 50 E128 E127 AFTER TRANSIT

CB CON 50 E127 E128 AFTER TRANSIT

EB E129 0 1 5 TANKER'S CARGO AVAIL DAY N+55

CD con 50 E129 World

CA CON 50 E129 E128 AFTER UNLOADING

CB CON 50 E128 E129 AFTER UNLOADING

CR E129 POL 1000 -1595000 27.5K GALS/TANKER ADDED TO SUPPLY IN KOREA

EB E130 0 11 5 RETURN TRIP FOR TANKER, 11 DAYS

CD con 50 E130 World

CA CON 50 E130 E128 AFTER UNLOADING

CB CON 50 E128 E130 AFTER UNLOADING

EB E131 0 1 5 TANKERS AVAIL TO RELOAD

Input File

CD con 50 E131 World
CA CON 50 E131 E130 AFTER RETURN TRANSIT
CB CON 50 E130 E131 AFTER RETURN TRANSIT
CR E131 TANKER 1000 -58 RETURN 58 TANKERS TO POOL DAY N+66

EB E150 0 3 5 LOAD FAST SEALIFT, 3 DAYS
CD con 50 E150 World
CA CON 50 E150 E9 AFTER FAST SEALIFTS ARE AVAIL @ N+5
CB CON 50 E9 E150 AFTER FAST SEALIFTS ARE AVAIL @ N+5
CR E150 RRFFAST 1000 10 SEND ALL 10 FAST SEALIFTS = 203K TONS CARGO

EB E151 0 7 5 IN TRANSIT, 7 DAYS, TO KOREA FROM WEST COAST
CD con 50 E151 World
CA CON 50 E151 E150 AFTER LOADING
CB CON 50 E150 E151 AFTER LOADING

EB E152 0 3 5 UNLOAD FAST SEALIFTS, 3 DAYS
CD con 50 E152 World
CA CON 50 E152 E151 AFTER TRANSIT
CB CON 50 E151 E152 AFTER TRANSIT

EB E153 0 1 5 FAST SEALIFT'S CARGO AVAIL DAY N+18
CD con 50 E153 World
CA CON 50 E153 E152 AFTER UNLOADING
CB CON 50 E152 E153 AFTER UNLOADING
CR E153 AMMO 1000 -121800 121.8K TONS AMMO (60% OF CARGO)
CR E153 OTHER 1000 -81200 81.2K TONS OTHER (40% OF CARGO)

EB E154 0 7 5 RETURN TRIP, 7 DAYS
CD con 50 E154 World
CA CON 50 E154 E152 AFTER UNLOADING
CB CON 50 E152 E154 AFTER UNLOADING

EB E155 0 1 5 FAST SEALIFTS AVAIL TO RELOAD
CD con 50 E155 World
CA CON 50 E155 E154 AFTER TRANSIT
CB CON 50 E154 E155 AFTER TRANSIT
CR E155 RRFFAST 1000 -10 RETURN 10 FAST SEALIFTS TO POOL DAY N+25

EB E156 0 3 5 LOAD FAST SEALIFT FOR NEXT TRIP, 3 DAYS
CD con 50 E156 World
CA CON 50 E156 E155 AFTER FAST SEALIFTS ARE AVAIL @ N+25
CB CON 50 E155 E156 AFTER FAST SEALIFTS ARE AVAIL @ N+25
CR E156 RRFFAST 1000 10 SEND ALL 10 FAST SEALIFTS = 203K TONS CARGO

EB E157 0 7 5 IN TRANSIT, 7 DAYS, TO KOREA FROM WEST COAST
CD con 50 E157 World
CA CON 50 E157 E156 AFTER LOADING

Input File

CB CON 50 E156 E157 AFTER LOADING
EB E158 0 3 5 ULOAD FAST SEALIFTS, 3 DAYS
CD con 50 E158 World
CA CON 50 E158 E157 AFTER TRANSIT
CB CON 50 E157 E158 AFTER TRANSIT
EB E159 0 1 5 FAST SEALIFT'S 2ND CARGO AVAIL DAY N+38
CD con 50 E159 World
CA CON 50 E159 E158 AFTER UNLOADING
CB CON 50 E158 E159 AFTER UNLOADING
CR E159 AMMO 1000 -121800 121.8K TONS AMMO (60% OF CARGO)
CR E159 OTHER 1000 -81200 81.2K TONS OTHER (40% OF CARGO)
EB E160 0 7 5 RETURN TRIP, 7 DAYS
CD con 50 E160 World
CA CON 50 E160 E158 AFTER UNLOADING
CB CON 50 E158 E160 AFTER UNLOADING
EB E161 0 1 5 FAST SEALIFTS AVAIL TO RELOAD
CD con 50 E161 World
CA CON 50 E161 E160 AFTER TRANSIT
CB CON 50 E160 E161 AFTER TRANSIT
CR E161 RRFFAST 1000 -10 RETURN 10 FAST SEALIFTS TO POOL DAY
N+45

EB E180 0 3 5 LOAD RO-ROS, 3 DAYS
CD con 50 E180 World
CA CON 50 E180 E11 AFTER RO-ROS ARE AVAIL @ N+10
CB CON 50 E11 E180 AFTER RO-ROS ARE AVAIL @ N+10
CR E180 RORO 1000 13 SEND ALL 13 RO-ROS = 198.9K TONS CARGO
EB E181 0 11 5 IN TRANSIT, 11 DAYS, TO KOREA FROM WEST
COAST
CD con 50 E181 World
CA CON 50 E181 E180 AFTER LOADING
CB CON 50 E180 E181 AFTER LOADING
EB E182 0 3 5 ULOAD RO-ROS, 3 DAYS
CD con 50 E182 World
CA CON 50 E182 E181 AFTER TRANSIT
CB CON 50 E181 E182 AFTER TRANSIT
EB E183 0 1 5 RO-RO'S CARGO AVAIL DAY N+27
CD con 50 E183 World
CA CON 50 E183 E182 AFTER UNLOADING
CB CON 50 E182 E183 AFTER UNLOADING
CR E183 AMMO 1000 -119300 119.3K TONS AMMO (60% OF CARGO)
CR E183 OTHER 1000 -79600 79.6K TONS OTHER (40% OF CARGO)
EB E184 0 11 5 RETURN TRIP, 11 DAYS
CD con 50 E184 World
CA CON 50 E184 E182 AFTER UNLOADING

Input File

CB CON 50 E182 E184 AFTER UNLOADING
EB E185 0 1 5 RO-ROS AVAIL TO RELOAD
CD con 50 E185 World
CA CON 50 E185 E184 AFTER TRANSIT
CB CON 50 E184 E185 AFTER TRANSIT
CR E185 RORO 1000 -13 RETURN 13 RO-ROS TO POOL DAY N+38

EB E186 0 3 5 LOAD RO-ROS FOR NEXT TRIP, 3 DAYS
CD con 50 E186 World
CA CON 50 E186 E185 1ST 13 HAVE RETURN + 8 MORE SHOULD BE AVAIL
CB CON 50 E185 E186 1ST 13 HAVE RETURN + 8 MORE SHOULD BE AVAIL
CR E186 RORO 1000 21 SEND ALL 21 RO-ROS = 321.3K TONS CARGO
EB E187 0 11 5 IN TRANSIT, 11 DAYS, TO KOREA FROM WEST
COAST
CD con 50 E187 World
CA CON 50 E187 E186 AFTER LOADING
CB CON 50 E186 E187 AFTER LOADING
EB E188 0 3 5 UNLOAD RO-ROS, 3 DAYS
CD con 50 E188 World
CA CON 50 E188 E187 AFTER TRANSIT
CB CON 50 E187 E188 AFTER TRANSIT
EB E189 0 1 5 RO-RO'S 2ND CARGO AVAIL DAY N+55
CD con 50 E189 World
CA CON 50 E189 E188 AFTER UNLOADING
CB CON 50 E188 E189 AFTER UNLOADING
CR E189 AMMO 1000 -192800 192.8K TONS AMMO (60% OF CARGO)
CR E189 OTHER 1000 -128500 128.5K TONS OTHER (40% OF CARGO)
EB E190 0 11 5 RETURN TRIP, 11 DAYS
CD con 50 E190 World
CA CON 50 E190 E188 AFTER UNLOADING
CB CON 50 E188 E190 AFTER UNLOADING
EB E191 0 1 5 RO-ROS AVAIL TO RELOAD
CD con 50 E191 World
CA CON 50 E191 E190 AFTER TRANSIT
CB CON 50 E190 E191 AFTER TRANSIT
CR E191 RORO 1000 -21 RETURN 21 RO-ROS TO POOL DAY N+45

EB E210 0 3 5 LOAD DRY CARGO SHIPS, 3 DAYS
CD con 50 E210 World
CA CON 50 E210 E15 AFTER DRY CARGO SHIPS ARE AVAIL @ N+30
CB CON 50 E15 E210 AFTER DRY CARGO SHIPS ARE AVAIL @ N+30
CR E210 DRYCARGO 1000 30 SEND 30 DRY CARGO = 630K TONS CARGO
EB E211 0 11 5 IN TRANSIT, 11 DAYS, TO KOREA FROM WEST
COAST
CD con 50 E211 World

Input File

CA CON 50 E211 E210 AFTER LOADING
CB CON 50 E210 E211 AFTER LOADING
EB E212 0 3 5 ULOAD DRY CARGO SHIPS, 3 DAYS
CD con 50 E212 World
CA CON 50 E212 E211 AFTER TRANSIT
CB CON 50 E211 E212 AFTER TRANSIT
EB E213 0 1 5 DRY CARGO SHIP'S CARGO AVAIL DAY N+47
CD con 50 E213 World
CA CON 50 E213 E212 AFTER UNLOADING
CB CON 50 E212 E213 AFTER UNLOADING
CR E213 AMMO 1000 -378000 378K TONS AMMO (60% OF CARGO)
CR E213 OTHER 1000 -252000 252K TONS OTHER (40% OF CARGO)
EB E214 0 11 5 RETURN TRIP, 11 DAYS
CD con 50 E214 World
CA CON 50 E214 E212 AFTER UNLOADING
CB CON 50 E212 E214 AFTER UNLOADING
EB E215 0 1 5 DRY CARGO SHIPS AVAIL TO RELOAD
CD con 50 E215 World
CA CON 50 E215 E214 AFTER TRANSIT
CB CON 50 E214 E215 AFTER TRANSIT
CR E215 DRYCARGO 1000 -30 RETURN 30 DRY CARGO SHIPS TO POOL
DAY N+58

EB E216 0 3 5 LOAD DRY CARGO SHIPS FOR NEXT TRIP, 3 DAYS
CD con 50 E216 World
CA CON 50 E216 E215 AVAIL AFTER N+58
CB CON 50 E215 E216 AVAIL AFTER N+58
CR E216 DRYCARGO 1000 30 SEND 30 DRY CARGO = 630K TONS CARGO
EB E217 0 11 5 IN TRANSIT, 11 DAYS, TO KOREA FROM WEST
COAST
CD con 50 E217 World
CA CON 50 E217 E216 AFTER LOADING
CB CON 50 E216 E217 AFTER LOADING
EB E218 0 3 5 ULOAD DRY CARGO SHIPS, 3 DAYS
CD con 50 E218 World
CA CON 50 E218 E217 AFTER TRANSIT
CB CON 50 E217 E218 AFTER TRANSIT
EB E219 0 1 5 DRY CARGO SHIP'S 2ND CARGO AVAIL DAY N+75
CD con 50 E219 World
CA CON 50 E219 E218 AFTER UNLOADING
CB CON 50 E218 E219 AFTER UNLOADING
CR E219 AMMO 1000 -378000 378K TONS AMMO (60% OF CARGO)
CR E219 OTHER 1000 -252000 252K TONS OTHER (40% OF CARGO)
EB E220 0 11 5 RETURN TRIP, 11 DAYS
CD con 50 E220 World

Input File

CA CON 50 E220 E218 AFTER UNLOADING
CB CON 50 E218 E220 AFTER UNLOADING
EB E221 0 1 5 DRY CARGO SHIPS AVAIL TO RELOAD
CD con 50 E221 World
CA CON 50 E221 E220 AFTER TRANSIT
CB CON 50 E220 E221 AFTER TRANSIT
CR E221 DRYCARGO 1000 -30 RETURN 30 DRY CARGO SHIP TO POOL
DAY N+86

EB E240 0 5 5 LOAD RRF CARGO SHIPS, 5 DAYS
CD con 50 E240 World
CA CON 50 E240 E10 AFTER RRF CARGO SHIPS ARE AVAIL @ N+10
CB CON 50 E10 E240 AFTER RRF CARGO SHIPS ARE AVAIL @ N+10
CR E240 RRFCARGO 1000 45 SEND 45 RRF CARGO = 504K TONS CARGO
EB E241 0 12 5 IN TRANSIT, 12 DAYS, TO KOREA FROM WEST
COAST
CD con 50 E241 World
CA CON 50 E241 E240 AFTER LOADING
CB CON 50 E240 E241 AFTER LOADING
EB E242 0 5 5 UNLOAD RRF CARGO SHIPS, 5 DAYS
CD con 50 E242 World
CA CON 50 E242 E241 AFTER TRANSIT
CB CON 50 E241 E242 AFTER TRANSIT
EB E243 0 1 5 RRF CARGO SHIP'S CARGO AVAIL DAY N+32
CD con 50 E243 World
CA CON 50 E243 E242 AFTER UNLOADING
CB CON 50 E242 E243 AFTER UNLOADING
CR E243 AMMO 1000 -302400 302.4K TONS AMMO (60% OF CARGO)
CR E243 OTHER 1000 -201600 201.6K TONS OTHER (40% OF CARGO)
EB E244 0 12 5 RETURN TRIP, 12 DAYS
CD con 50 E244 World
CA CON 50 E244 E242 AFTER UNLOADING
CB CON 50 E242 E244 AFTER UNLOADING
EB E245 0 1 5 RRF CARGO SHIPS AVAIL TO RELOAD
CD con 50 E245 World
CA CON 50 E245 E244 AFTER TRANSIT
CB CON 50 E244 E245 AFTER TRANSIT
CR E245 RRFCARGO 1000 -45 RETURN 45 RRF CARGO SHIPS TO POOL
DAY N+44

EB E246 0 5 5 LOAD RRF CARGO SHIPS FOR NEXT TRIP, 5 DAYS
CD con 50 E246 World
CA CON 50 E246 E245 AVAIL AFTER N+44
CB CON 50 E245 E246 AVAIL AFTER N+44
CR E246 RRFCARGO 1000 45 SEND 45 RRF CARGO = 504K TONS CARGO

Input File

EB E247 0 12 5 IN TRANSIT, 12 DAYS, TO KOREA FROM WEST
COAST
CD con 50 E247 World
CA CON 50 E247 E246 AFTER LOADING
CB CON 50 E246 E247 AFTER LOADING
EB E248 0 5 5 UNLOAD RRF CARGO SHIPS, 5 DAYS
CD con 50 E248 World
CA CON 50 E248 E247 AFTER TRANSIT
CB CON 50 E247 E248 AFTER TRANSIT
EB E249 0 1 5 RRF CARGO SHIP'S 2ND CARGO AVAIL DAY N+66
CD con 50 E249 World
CA CON 50 E249 E248 AFTER UNLOADING
CB CON 50 E248 E249 AFTER UNLOADING
CR E249 AMMO 1000 -302400 302.4K TONS AMMO (60% OF CARGO)
CR E249 OTHER 1000 -201600 201.6K TONS OTHER (40% OF CARGO)
EB E250 0 12 5 RETURN TRIP, 12 DAYS
CD con 50 E250 World
CA CON 50 E250 E248 AFTER UNLOADING
CB CON 50 E248 E250 AFTER UNLOADING
EB E251 0 1 5 RRF CARGO SHIPS AVAIL TO RELOAD
CD con 50 E251 World
CA CON 50 E251 E250 AFTER TRANSIT
CB CON 50 E250 E251 AFTER TRANSIT
CR E251 RRF CARGO 1000 -45 RETURN 45 RRF CARGO SHIP TO POOL DAY
N+86

Appendix C-2

GUESS Output Using the Genetic Algorithm Approach for Scheduling Military Units in a Deployed Theater

RD C141 210	210 C-141 CARGO PLANES @ 45 TONS EACH
RD C5 100	100 C-5 CARGO PLANES @ 101 TONS EACH
RD C17 20	20 C-17 CARGO PLANES @ 86 TONS EACH
RD CRAF 30	30 CRAF CARGO PLANES @ 70 TONS EACH
RD PAX 34	34 C-141 PAX PLANES @ 200 EACH
RD RFFFAST 0	NO FAST SEALIFT SHIPS AVAIL @ N-DAY
RD RRF CARGO 0	NO RRF CARGO SHIPS AVAIL @ N-DAY
RD RO-RO 0	NO RO-RO SHIPS AVAIL @ N-DAY
RD DRYCARGO 0	NO DRY CARGO SHIPS AVAIL @ N-DAY
RD TANKER 0	NO TANKER SHIPS AVAIL @ N-DAY
RD AMMO 120000	120K TONS AMMO ON SITE @ N-DAY
RD POL 83330	83.33K GAL POL ON SITE @ N-DAY
RD OTHER 149000	149K TONS OTHER SUPPLIES ON SITE @ N-DAY
RD PAXEAST 0	PAX ON EAST COAST TO BE MOVED
RD EQUIPEAST 0	EQUIPMENT ON EAST COAST TO BE MOVED
RD PAXGULF 0	PAX ON GULF COAST TO BE MOVED
RD EQUIPGULF 0	EQUIPMENT ON GULF COAST TO BE MOVED
RD PAXWEST 0	PAX ON WEST COAST TO BE MOVED
RD EQUIPWEST 0	EQUIPMENT ON WEST COAST TO BE MOVED
eLocked World 819275168 824459168 10	
eLocked E1 819275168 819361568 5	NOTIFICATION OF
MOBILIZATION (N-DAY)	
cBefor CON 50 E1 E5 MOBILIZE AIRLIFT AFTER N-DAY	
cBefor CON 50 E1 E6 MOBILIZE SEALIFT AFTER N-DAY	
cBefor CON 50 E1 E7 MOBILIZE CRAF, PHASE I, AFTER N-DAY	
cBefor CON 50 E1 E20 AFTER NOTIFICATION	
cBefor CON 50 E1 E21 AFTER NOTIFICATION	
cBefor CON 50 E1 E22 AFTER NOTIFICATION	
cBefor CON 50 E1 E23 AFTER NOTIFICATION	
eLocked E2 819275168 819707168 5	N+5
cStartWith CON 100 E2 E1	
cStartWith CON 100 E2 E1	
cStartWith CON 100 E2 E1	
cBefor CON 50 E2 E9 FAST SEALIFT AVAIL @ N+5	
eLocked E3 819275168 820139168 5	N+10
cStartWith CON 100 E3 E1	
cStartWith CON 100 E3 E1	
cStartWith CON 100 E3 E1	
cBefor CON 50 E3 E10 RRF CARGO AVAIL @ N+10	
cBefor CON 50 E3 E11 RRF RO-RO AVAIL @ N+10	
cBefor CON 50 E3 E16 RRF TANKERS AVAIL @ N+10	
eLocked E4 819275168 821867168 5	N+30
cStartWith CON 100 E4 E1	
cStartWith CON 100 E4 E1	
cStartWith CON 100 E4 E1	

Genetic Algorithm Output

cBefor CON 50 E4 E8 BEGIN PHASE II OF CRAF @ N+30
cBefor CON 50 E4 E12 MSC RO-RO AVAIL @ N+30
cBefor CON 50 E4 E13 US FLAG RO-RO AVAIL @ N+30
cBefor CON 50 E4 E14 MSC DRY CARGO AVAIL @ N+30
cBefor CON 50 E4 E15 US FLAG DRY CARGO AVAIL @ N+30
cBefor CON 50 E4 E17 MSC TANKERS AVAIL @ N+30
cBefor CON 50 E4 E18 US FLAG TANKER AVAIL @ N+30
eBase E5 819275168 819361568 5 MOBILIZE AIRLIFT
cDuring con 50 E5 World
cAfter CON 50 E5 E1 MOBILIZE AIRLIFT AFTER N-DAY
eBase E6 819275168 819361568 5 MOBILIZE SEALIFT
cDuring con 50 E6 World
cAfter CON 50 E6 E1 MOBILIZE SEALIFT AFTER N-DAY
eBase E7 819275168 819361568 5 MOBILIZE CRAF PHASE I
cDuring con 50 E7 World
cAfter CON 50 E7 E1 MOBILIZE CRAF, PHASE I, AFTER N-DAY
CR E7 PAX 100 -18 CRAF I, ADDS 18 PAX PLANES @ 200 EACH
eBase E8 819275168 819361568 5 BEGIN PHASE II OF CRAF
cDuring con 50 E8 World
cAfter CON 50 E8 E4 BEGIN PHASE II OF CRAF @ N+30
CR E8 PAX 100 -67 CRAF II, ADDS 67 PAX PLANES @ 200 EACH
CR E8 CRAF 100 -19 CRAF II, ADDS 19 CARGO PLANES @ 70 TONS EACH
eBase E9 815646358 815732758 5 FAST SEALIFT SHIPS AVAIL
cDuring con 50 E9 World
cAfter CON 50 E9 E2 FAST SEALIFT AVAIL @ N+5
CR E9 RRFFAST 100 -13 13 CARGO SHIPS @ 20.3K TONS, 30 KTS
cBefor CON 50 E9 E150 AFTER FAST SEALIFTS ARE AVAIL @ N+5
eBase E10 813227158 813313558 5 RRF CARGO SHIPS AVAIL
cDuring con 50 E10 World
cAfter CON 50 E10 E3 RRF CARGO AVAIL @ N+10
CR E10 RRFCARGO 100 -45 45 CARGO SHIPS AVAIL @ 11.2K TONS, 17.3 KTS
cBefor CON 50 E10 E240 AFTER RRF CARGO SHIPS ARE AVAIL @ N+10
eBase E11 814263958 814350358 5 RRF RO-RO SHIPS AVAIL
cDuring con 50 E11 World
cAfter CON 50 E11 E3 RRF RO-RO AVAIL @ N+10
CR E11 RORO 100 -13 13 RO-RO SHIPS @ 15.3K TONS, 19.5 KTS
cBefor CON 50 E11 E180 AFTER RO-ROS ARE AVAIL @ N+10
eBase E12 819275168 819361568 5 MSC RO-RO SHIPS AVAIL
cDuring con 50 E12 World
cAfter CON 50 E12 E4 MSC RO-RO AVAIL @ N+30
CR E12 RORO 100 -4 4 MORE RO-RO SHIPS @ 15.3K TONS, 19.5 KTS
eBase E13 819275168 819361568 5 US FLAG RO-RO SHIPS AVAIL
cDuring con 50 E13 World

Genetic Algorithm Output

cAfter CON 50 E13 E4 US FLAG RO-RO AVAIL @ N+30
CR E13 RORO 100 -4 MORE RO-RO SHIPS @ 15.3K TONS, 19.5 KTS
eBase E14 819275168 819361568 5 MSC DRY CARGO SHIPS AVAIL
cDuring con 50 E14 World
cAfter CON 50 E14 E4 MSC DRY CARGO AVAIL @ N+30
CR E14 DRYCARGO 100 -6 6 DRY CARGO SHIPS @ 21K TONS, 20 KTS
eBase E15 814263958 814350358 5 US FLAG DRY CARGO SHIPS
AVAIL
cDuring con 50 E15 World
cAfter CON 50 E15 E4 US FLAG DRY CARGO AVAIL @ N+30
CR E15 DRYCARGO 100 -24 24 MORE DRY CARGO SHIPS @ 21K TONS, 20
KTS
cBefore CON 50 E15 E210 AFTER DRY CARGO SHIPS ARE AVAIL @ N+30
eBase E16 814263958 814350358 5 RRF TANKERS AVAIL
cDuring con 50 E16 World
cAfter CON 50 E16 E3 RRF TANKERS AVAIL @ N+10
CR E16 TANKER 100 -10 10 TANKERS AVAIL @ 27.5K GAL, 20 KTS
cBefore CON 50 E16 E120 AFTER TANKERS ARE AVAIL @ N+10
eBase E17 819275168 819361568 5 MSC TANKERS AVAIL
cDuring con 50 E17 World
cAfter CON 50 E17 E4 MSC TANKERS AVAIL @ N+30
CR E17 TANKER 100 -15 15 MORE TANKERS AVAIL @ 27.5K GAL, 20
KTS
eBase E18 819275168 819361568 5 US FLAG TANKERS AVAIL
cDuring con 50 E18 World
cAfter CON 50 E18 E4 US FLAG TANKER AVAIL @ N+30
CR E18 TANKER 100 -33 33 MORE TANKERS AVAIL @ 27.5K GAL, 20
KTS
eBase E20 818670363 818756763 5 MOBILIZE BOMBER WING #2,
EAST COAST, N+1
cDuring con 50 E20 World
cAfter CON 50 E20 E1 AFTER NOTIFICATION
CR E20 PAXEAST 100 -3300 3300 PAX TO MOVE FROM EAST COAST
CR E20 EQUIPEAST 100 -4000 4.0K TONS OF EQUIP TO MOVE FROM EAST
COAST
cBefore CON 50 E20 E50 AFTER MOBILIZATION
eBase E21 818670363 818756763 5 MOBILIZE BOMBER WING #3,
GULF COAST, N+1
cDuring con 50 E21 World
cAfter CON 50 E21 E1 AFTER NOTIFICATION
CR E21 PAXGULF 100 -3300 3300 PAX TO MOVE FROM EAST COAST
CR E21 EQUIPGULF 100 -4000 4.0K TONS OF EQUIP TO MOVE FROM EAST
COAST
cBefore CON 50 E21 E30 AFTER MOBILIZATION

Genetic Algorithm Output

eBase E22 818151960 818238360 5 MOBILIZE FIGHTER WING #2,
WEST COAST, N+1
cDuring con 50 E22 World
cAfter CON 50 E22 E1 AFTER NOTIFICATION
CR E22 PAXWEST 100 -3300 3300 PAX TO BE MOVED FROM WEST COAST
CR E22 EQUIPEAST 100 -4000 3300 PAX TO MOVE FROM EAST COAST
cBefor CON 50 E22 E60 AFTER MOBILIZATION
eBase E23 818670363 818756763 5 MOBILIZE FIGHTER WING #3,
GULF COAST, N+1
cDuring con 50 E23 World
cAfter CON 50 E23 E1 AFTER NOTIFICATION
CR E23 PAXGULF 100 -3300 ADD 3300 PAX TO MOVE FROM GULF COAST
CR E23 EQUIPGULF 100 -4000 ADD 4.0K TONS OF EQUIP TO MOVE FROM
EAST COAST
cBefor CON 50 E23 E40 AFTER MOBILIZATION
eBase E30 818756764 818843164 5 LOAD BOMBER WING #3, 1 DAY,
GULF COAST, N+2
cDuring con 50 E30 World
cAfter CON 50 E30 E21 AFTER MOBILIZATION
CR E30 C5 100 40 USE 40 C-5'S
CR E30 EQUIPGULF 100 4000 TO MOVE BW3'S 4.0K TONS OF EQUIPMENT
CR E30 PAX 100 17 USE 17 PAX PLANES
CR E30 PAXGULF 100 3300 TO MOVE BW3'S 3300 PERSONNEL
cBefor CON 50 E30 E31 AFTER LOAD
eBase E31 818843165 818929565 5 TRANSIT TIME TO KOREA, 1 DAY
cDuring con 50 E31 World
cAfter CON 50 E31 E30 AFTER LOAD
cBefor CON 50 E31 E32 AFTER TRANSIT
eBase E32 818929566 819015966 5 UNLOAD BW3, 1 DAY, N+4
cDuring con 50 E32 World
cAfter CON 50 E32 E31 AFTER TRANSIT
cBefor CON 50 E32 E33 AFTER UNLOAD
cBefor CON 5 E32 E35 AFTER UNLOAD
eBase E33 819015967 819275167 5 ASSEMBLE UNIT, 3 DAYS
cDuring con 50 E33 World
cAfter CON 50 E33 E32 AFTER UNLOAD
cBefor CON 50 E33 E34 AFTER ASSEMBLE
eBase E34 819275168 819361568 5 BW3 EQUIPMENT AND
PERSONNEL IN PLACE @ N+7
cDuring con 50 E34 World
cAfter CON 50 E34 E33 AFTER ASSEMBLE
eBase E35 819188767 819275167 5 AIRCRAFT RETURN TRANSIT TO
US, 1 DAY
cDuring con 50 E35 World
cAfter CON 5 E35 E32 AFTER UNLOAD

Genetic Algorithm Output

cBefor CON 5 E35 E36 AFTER TRANSIT
 eBase E36 819275168 819361568 5 AIRCRAFT AVAILABLE, N+5
 cDuring con 50 E36 World
 cAfter ON 5 E36 E35 AFTER TRANSIT
 CR E36 C5 100 -40 40 C-5 RETURNED TO THE POOL
 CR E36 PAX 100 -17 17 PAX PLANES RETURNED TO THE POOL
 eBase E40 818756764 818843164 5 LOAD FIGHTER WIND #3, 1 DAY,
 GULF COAST, N+2
 cDuring con 50 E40 World
 cAfter CON 50 E40 E23 AFTER MOBILIZATION
 CR E40 C5 100 40 USE 40 C-5'S
 CR E40 EQUIPGULF 100 4000 TO MOVE FW3'S 4.0K TONS OF EQUIPMENT
 CR E40 PAX 100 17 USE 17 PAX PLANES
 CR E40 PAXGULF 100 3300 TO MOVE FW3'S 3300 PERSONNEL
 cBefor CON 50 E40 E41 AFTER LOAD
 eBase E41 818843165 818929565 5 TRANSIT TIME TO KOREA, 1 DAY
 cDuring con 50 E41 World
 cAfter CON 50 E41 E40 AFTER LOAD
 cBefor CON 50 E41 E42 AFTER TRANSIT
 eBase E42 818929566 819015966 5 UNLOAD FW3, 1 DAY, N+4
 cDuring con 50 E42 World
 cAfter CON 50 E42 E41 AFTER TRANSIT
 cBefor CON 50 E42 E43 AFTER UNLOAD
 cBefor CON 5 E42 E45 AFTER UNLOAD
 eBase E43 819015967 819275167 5 ASSEMBLE UNIT, 3 DAYS
 cDuring con 50 E43 World
 cAfter CON 50 E43 E42 AFTER UNLOAD
 cBefor CON 50 E43 E44 AFTER ASSEMBLE
 eBase E44 819275168 819361568 5 FW3 EQUIPMENT AND
 PERSONNEL IN PLACE @ N+7
 cDuring con 50 E44 World
 cAfter CON 50 E44 E43 AFTER ASSEMBLE
 eBase E45 819188767 819275167 5 AIRCRAFT RETURN TRANSIT TO
 US, 1 DAY
 cDuring con 50 E45 World
 cAfter CON 5 E45 E42 AFTER UNLOAD
 cBefor CON 5 E45 E46 AFTER TRANSIT
 eBase E46 819275168 819361568 5 AIRCRAFT AVAILABLE, N+5
 cDuring con 50 E46 World
 cAfter CON 5 E46 E45 AFTER TRANSIT
 CR E46 C5 100 -40 40 C-5 RETURNED TO THE POOL
 CR E46 PAX 100 -17 17 PAX PLANES RETURNED TO THE POOL
 eBase E50 818756764 818843164 5 LOAD BOMBER WING #2, 1 DAY,
 EAST COAST, N+2
 cDuring con 50 E50 World

Genetic Algorithm Output

cAfter CON 50 E50 E20 AFTER MOBILIZATION
CR E50 C5 100 20 USE 20 C-5'S AND
CR E50 C141 100 45 USE 45 C-141'S
CR E50 EQUIPEAST 100 4000 TO MOVE BW2'S 4.0K TONS OF EQUIPMENT
CR E50 PAX 100 17 USE 17 PAX PLANES
CR E50 PAXEAST 100 3300 TO MOVE BW2'S 3300 PERSONNEL
cBefor CON 50 E50 E51 AFTER LOAD
eBase E51 818843165 818929565 5 TRANSIT TIME TO KOREA, 1 DAY
cDuring con 50 E51 World
cAfter CON 50 E51 E50 AFTER LOAD
cBefor CON 50 E51 E52 AFTER TRANSIT
eBase E52 818929566 819015966 5 UNLOAD BW2, 1 DAY, N+4
cDuring con 50 E52 World
cAfter CON 50 E52 E51 AFTER TRANSIT
cBefor CON 50 E52 E53 AFTER UNLOAD
cBefor CON 5 E52 E55 AFTER UNLOAD
eBase E53 819015967 819275167 5 ASSEMBLE UNIT, 3 DAYS
cDuring con 50 E53 World
cAfter CON 50 E53 E52 AFTER UNLOAD
cBefor CON 50 E53 E54 AFTER ASSEMBLE
eBase E54 819275168 819361568 5 BW2'S EQUIPMENT AND
PERSONNEL IN PLACE @ N+7
cDuring con 50 E54 World
cAfter CON 50 E54 E53 AFTER ASSEMBLE
eBase E55 819188767 819275167 5 AIRCRAFT RETURN TRANSIT TO
US, 1 DAY
cDuring con 50 E55 World
cAfter CON 5 E55 E52 AFTER UNLOAD
cBefor CON 5 E55 E56 AFTER TRANSIT
eBase E56 819275168 819361568 5 AIRCRAFT AVAILABLE, N+5
cDuring con 50 E56 World
cAfter CON 5 E56 E55 AFTER TRANSIT
CR E56 C5 100 -20 20 C-5 RETURNED TO THE POOL
CR E56 C141 100 -45 45 C-141 RETURNED TO THE POOL
CR E56 PAX 100 -17 17 PAX PLANES RETURNED TO THE POOL
eBase E60 818238361 818583961 5 WAIT FOR AIRCRAFT
AVAILABILITY, 4 DAYS
cDuring con 50 E60 World
cAfter CON 50 E60 E22 AFTER MOBILIZATION
cBefor CON 50 E60 E61 AFTER WAIT
eBase E61 818583962 818670362 5 LOAD FIGHTER WIND #2, 1 DAY,
WEST COAST, N+6
cDuring con 50 E61 World
cAfter CON 50 E61 E60 AFTER WAIT
CR E61 C141 100 89 USE 89 C-141'S

Genetic Algorithm Output

CR E61 EQUIPWEST 100 4000 TO MOVE FW2'S 4.0K TONS OF EQUIPMENT
 CR E61 PAX 100 17 USE 17 PAX PLANES
 CR E61 PAXWEST 100 3300 TO MOVE FW2'S 3300 PERSONNEL
 cBefor CON 50 E61 E62 AFTER LOAD
 eBase E62 818670363 818756763 5 TRANSIT TIME TO KOREA, 1 DAY
 cDuring con 50 E62 World
 cAfter CON 50 E62 E61 AFTER LOAD
 cBefor CON 50 E62 E63 AFTER TRANSIT
 eBase E63 818756764 818843164 5 UNLOAD FW2, 1 DAY, N+8
 cDuring con 50 E63 World
 cAfter CON 50 E63 E62 AFTER TRANSIT
 cBefor CON 50 E63 E64 AFTER UNLOAD
 eBase E64 818843165 819102365 5 ASSEMBLE UNIT, 3 DAYS
 cDuring con 50 E64 World
 cAfter CON 50 E64 E63 AFTER UNLOAD
 cBefor CON 50 E64 E65 AFTER ASSEMBLE
 eBase E65 819102366 819188766 5 FW2 EQUIPMENT AND
 PERSONNEL IN PLACE @ N+11
 cDuring con 50 E65 World
 cAfter CON 50 E65 E64 AFTER ASSEMBLE
 cBefor CON 5 E65 E66 AFTER UNLOAD
 eBase E66 819188767 819275167 5 AIRCRAFT RETURN TRANSIT TO
 US, 1 DAY
 cDuring con 50 E66 World
 cAfter CON 5 E66 E65 AFTER UNLOAD
 cBefor CON 5 E66 E67 AFTER TRANSIT
 eBase E67 819275168 819361568 5 AIRCRAFT AVAILABLE, N+9
 cDuring con 50 E67 World
 cAfter CON 5 E67 E66 AFTER TRANSIT
 CR E67 C141 100 -89 89 C-141 RETURNED TO THE POOL
 CR E67 PAX 100 -17 17 PAX PLANES RETURNED TO THE POOL
 eBase E120 814350359 814609559 5 LOAD TANKERS, 3 DAYS
 cDuring con 50 E120 World
 cAfter CON 50 E120 E16 AFTER TANKERS ARE AVAIL @ N+10
 CR E120 TANKER 100 10 SEND ALL 10 TANKERS = 275K GAL POL
 cBefor CON 50 E120 E121 AFTER LOADING
 eBase E121 814609560 815559960 5 IN TRANSIT, 11 DAYS, TO KOREA
 FROM WEST COAST
 cDuring con 50 E121 World
 cAfter CON 50 E121 E120 AFTER LOADING
 cBefor CON 50 E121 E122 AFTER TRANSIT
 eBase E122 815559961 815819161 5 UNLOAD TANKERS, 3 DAYS
 cDuring con 50 E122 World
 cAfter CON 50 E122 E121 AFTER TRANSIT
 cBefor CON 50 E122 E123 AFTER UNLOADING

Genetic Algorithm Output

cBefor CON 50 E122 E124 AFTER UNLOADING
eBase E123 819275168 819361568 5 TANKER'S CARGO AVAIL DAY
N+27
cDuring con 50 E123 World
cAfter CON 50 E123 E122 AFTER UNLOADING
CR E123 POL 100 -275000 27.5K GALS/TANKER ADDED TO SUPPLY IN
KOREA
eBase E124 815819162 816769562 5 RETURN TRIP FOR TANKER, 11
DAYS
cDuring con 50 E124 World
cAfter CON 50 E124 E122 AFTER UNLOADING
cBefor CON 50 E124 E125 AFTER TRANSIT
eBase E125 816769563 816855963 5 TANKER AVAIL
cDuring con 50 E125 World
cAfter CON 50 E125 E124 AFTER TRANSIT
CR E125 TANKER 100 -10 RETURN 10 TANKERS TO POOL DAY N+38
cBefor CON 50 E125 E126 1ST 10 HAVE RETURN + 38 MORE SHOULD BE
AVAIL
eBase E126 816855964 817115164 5 LOAD TANKERS FOR NEXT TRIP
3 DAYS
cDuring con 50 E126 World
cAfter CON 50 E126 E125 1ST 10 HAVE RETURN + 38 MORE SHOULD BE
AVAIL
CR E126 TANKER 100 58 SEND ALL 58 TANKERS = 1595K GAL POL
cBefor CON 50 E126 E127 AFTER LOADING
eBase E127 817115165 818065565 5 IN TRANSIT, 11 DAYS, TO KOREA
FROM WEST COAST
cDuring con 50 E127 World
cAfter CON 50 E127 E126 AFTER LOADING
cBefor CON 50 E127 E128 AFTER TRANSIT
eBase E128 818065566 818324766 5 ULOAD TANKERS, 3 DAYS
cDuring con 50 E128 World
cAfter CON 50 E128 E127 AFTER TRANSIT
cBefor CON 50 E128 E129 AFTER UNLOADING
cBefor CON 50 E128 E130 AFTER UNLOADING
eBase E129 819275168 819361568 5 TANKER'S CARGO AVAIL DAY
N+55
cDuring con 50 E129 World
cAfter CON 50 E129 E128 AFTER UNLOADING
CR E129 POL 100 -1.595e+006 27.5K GALS/TANKER ADDED TO SUPPLY IN
KOREA
eBase E130 818324767 819275167 5 RETURN TRIP FOR TANKER, 11
DAYS
cDuring con 50 E130 World
cAfter CON 50 E130 E128 AFTER UNLOADING

Genetic Algorithm Output

cBefor CON 50 E130 E131 AFTER RETURN TRANSIT
eBase E131 819275168 819361568 5 TANKERS AVAIL TO RELOAD
cDuring con 50 E131 World
cAfter CON 50 E131 E130 AFTER RETURN TRANSIT
CR E131 TANKER 100 -58 RETURN 58 TANKERS TO POOL DAY N+66
eBase E150 815732759 815991959 5 LOAD FAST SEALIFT, 3 DAYS
cDuring con 50 E150 World
cAfter CON 50 E150 E9 AFTER FAST SEALIFTS ARE AVAIL @ N+5
CR E150 RRFFAST 100 10 SEND ALL 10 FAST SEALIFTS = 203K TONS
CARGO
cBefor CON 50 E150 E151 AFTER LOADING
eBase E151 815991960 816596760 5 IN TRANSIT, 7 DAYS, TO KOREA
FROM WEST COAST
cDuring con 50 E151 World
cAfter CON 50 E151 E150 AFTER LOADING
cBefor CON 50 E151 E152 AFTER TRANSIT
eBase E152 816596761 816855961 5 UNLOAD FAST SEALIFTS, 3 DAYS
cDuring con 50 E152 World
cAfter CON 50 E152 E151 AFTER TRANSIT
cBefor CON 50 E152 E153 AFTER UNLOADING
cBefor CON 50 E152 E154 AFTER UNLOADING
eBase E153 819275168 819361568 5 FAST SEALIFT'S CARGO AVAIL
DAY N+18
cDuring con 50 E153 World
cAfter CON 50 E153 E152 AFTER UNLOADING
CR E153 AMMO 100 -121800 121.8K TONS AMMO (60% OF CARGO)
CR E153 OTHER 100 -81200 81.2K TONS OTHER (40% OF CARGO)
eBase E154 816855962 817460762 5 RETURN TRIP, 7 DAYS
cDuring con 50 E154 World
cAfter CON 50 E154 E152 AFTER UNLOADING
cBefor CON 50 E154 E155 AFTER TRANSIT
eBase E155 817460763 817547163 5 FAST SEALIFTS AVAIL TO
RELOAD
cDuring con 50 E155 World
cAfter CON 50 E155 E154 AFTER TRANSIT
CR E155 RRFFAST 100 -10 RETURN 10 FAST SEALIFTS TO POOL DAY
N+25
cBefor CON 50 E155 E156 AFTER FAST SEALIFTS ARE AVAIL @ N+25
eBase E156 817547164 817806364 5 LOAD FAST SEALIFT FOR NEXT
TRIP, 3 DAYS
cDuring con 50 E156 World
cAfter CON 50 E156 E155 AFTER FAST SEALIFTS ARE AVAIL @ N+25
CR E156 RRFFAST 100 10 SEND ALL 10 FAST SEALIFTS = 203K TONS
CARGO
cBefor CON 50 E156 E157 AFTER LOADING

Genetic Algorithm Output

eBase E157 817806365 818411165 5 IN TRANSIT, 7 DAYS, TO KOREA
FROM WEST COAST
cDuring con 50 E157 World
cAfter CON 50 E157 E156 AFTER LOADING
cBefor CON 50 E157 E158 AFTER TRANSIT
eBase E158 818411166 818670366 5 UNLOAD FAST SEALIFTS, 3 DAYS
cDuring con 50 E158 World
cAfter CON 50 E158 E157 AFTER TRANSIT
cBefor CON 50 E158 E159 AFTER UNLOADING
cBefor CON 50 E158 E160 AFTER UNLOADING
eBase E159 819275168 819361568 5 FAST SEALIFT'S 2ND CARGO
AVAIL DAY N+38
cDuring con 50 E159 World
cAfter CON 50 E159 E158 AFTER UNLOADING
CR E159 AMMO 100 -121800 121.8K TONS AMMO (60% OF CARGO)
CR E159 OTHER 100 -81200 81.2K TONS OTHER (40% OF CARGO)
eBase E160 818670367 819275167 5 RETURN TRIP, 7 DAYS
cDuring con 50 E160 World
cAfter CON 50 E160 E158 AFTER UNLOADING
cBefor CON 50 E160 E161 AFTER TRANSIT
eBase E161 819275168 819361568 5 FAST SEALIFTS AVAIL TO
RELOAD
cDuring con 50 E161 World
cAfter CON 50 E161 E160 AFTER TRANSIT
CR E161 RRFFAST 100 -10 RETURN 10 FAST SEALIFTS TO POOL DAY
N+45
eBase E180 814350359 814609559 5 LOAD RO-ROS, 3 DAYS
cDuring con 50 E180 World
cAfter CON 50 E180 E11 AFTER RO-ROS ARE AVAIL @ N+10
CR E180 RORO 100 13 SEND ALL 13 RO-ROS = 198.9K TONS CARGO
cBefor CON 50 E180 E181 AFTER LOADING
eBase E181 814609560 815559960 5 IN TRANSIT, 11 DAYS, TO KOREA
FROM WEST COAST
cDuring con 50 E181 World
cAfter CON 50 E181 E180 AFTER LOADING
cBefor CON 50 E181 E182 AFTER TRANSIT
eBase E182 815559961 815819161 5 UNLOAD RO-ROS, 3 DAYS
cDuring con 50 E182 World
cAfter CON 50 E182 E181 AFTER TRANSIT
cBefor CON 50 E182 E183 AFTER UNLOADING
cBefor CON 50 E182 E184 AFTER UNLOADING
eBase E183 819275168 819361568 5 RO-RO'S CARGO AVAIL DAY
N+27
cDuring con 50 E183 World
cAfter CON 50 E183 E182 AFTER UNLOADING

Genetic Algorithm Output

CR E183 AMMO 100 -119300 119.3K TONS AMMO (60% OF CARGO)
CR E183 OTHER 100 -79600 79.6K TONS OTHER (40% OF CARGO)
eBase E184 815819162 816769562 5 RETURN TRIP, 11 DAYS
cDuring con 50 E184 World
cAfter CON 50 E184 E182 AFTER UNLOADING
cBefor CON 50 E184 E185 AFTER TRANSIT
eBase E185 816769563 816855963 5 RO-ROS AVAIL TO RELOAD
cDuring con 50 E185 World
cAfter CON 50 E185 E184 AFTER TRANSIT
CR E185 RORO 100 -13 RETURN 13 RO-ROS TO POOL DAY N+38
cBefor CON 50 E185 E186 1ST 13 HAVE RETURN + 8 MORE SHOULD BE AVAIL
eBase E186 816855964 817115164 5 LOAD RO-ROS FOR NEXT TRIP, 3
DAYS
cDuring con 50 E186 World
cAfter CON 50 E186 E185 1ST 13 HAVE RETURN + 8 MORE SHOULD BE AVAIL
CR E186 RORO 100 21 SEND ALL 21 RO-ROS = 321.3K TONS CARGO
cBefor CON 50 E186 E187 AFTER LOADING
eBase E187 817115165 818065565 5 IN TRANSIT, 11 DAYS. TO KOREA
FROM WEST COAST
cDuring con 50 E187 World
cAfter CON 50 E187 E186 AFTER LOADING
cBefor CON 50 E187 E188 AFTER TRANSIT
eBase E188 818065566 818324766 5 UNLOAD RO-ROS, 3 DAYS
cDuring con 50 E188 World
cAfter CON 50 E188 E187 AFTER TRANSIT
cBefor CON 50 E188 E189 AFTER UNLOADING
cBefor CON 50 E188 E190 AFTER UNLOADING
eBase E189 819275168 819361568 5 RO-RO'S 2ND CARGO AVAIL DAY
N+55
cDuring con 50 E189 World
cAfter CON 50 E189 E188 AFTER UNLOADING
CR E189 AMMO 100 -192800 192.8K TONS AMMO (60% OF CARGO)
CR E189 OTHER 100 -128500 128.5K TONS OTHER (40% OF CARGO)
eBase E190 818324767 819275167 5 RETURN TRIP, 11 DAYS
cDuring con 50 E190 World
cAfter CON 50 E190 E188 AFTER UNLOADING
cBefor CON 50 E190 E191 AFTER TRANSIT
eBase E191 819275168 819361568 5 RO-ROS AVAIL TO RELOAD
cDuring con 50 E191 World
cAfter CON 50 E191 E190 AFTER TRANSIT
CR E191 RORO 100 -21 RETURN 21 RO-ROS TO POOL DAY N+45
eBase E210 814350359 814609559 5 LOAD DRY CARGO SHIPS, 3
DAYS
cDuring con 50 E210 World
cAfter CON 50 E210 E15 AFTER DRY CARGO SHIPS ARE AVAIL @ N+30

Genetic Algorithm Output

CR E210 DRYCARGO 100 30 SEND 30 DRY CARGO = 630K TONS CARGO
cBefor CON 50 E210 E211 AFTER LOADING
eBase E211 814609560 815559960 5 IN TRANSIT, 11 DAYS, TO KOREA
FROM WEST COAST
cDuring con 50 E211 World
cAfter CON 50 E211 E210 AFTER LOADING
cBefor CON 50 E211 E212 AFTER TRANSIT
eBase E212 815559961 815819161 5 UNLOAD DRY CARGO SHIPS, 3
DAYS
cDuring con 50 E212 World
cAfter CON 50 E212 E211 AFTER TRANSIT
cBefor CON 50 E212 E213 AFTER UNLOADING
cBefor CON 50 E212 E214 AFTER UNLOADING
eBase E213 819275168 819361568 5 DRY CARGO SHIP'S CARGO
AVAIL DAY N+47
cDuring con 50 E213 World
cAfter CON 50 E213 E212 AFTER UNLOADING
CR E213 AMMO 100 -378000 378K TONS AMMO (60% OF CARGO)
CR E213 OTHER 100 -252000 252K TONS OTHER (40% OF CARGO)
eBase E214 815819162 816769562 5 RETURN TRIP, 11 DAYS
cDuring con 50 E214 World
cAfter CON 50 E214 E212 AFTER UNLOADING
cBefor CON 50 E214 E215 AFTER TRANSIT
eBase E215 816769563 816855963 5 DRY CARGO SHIPS AVAIL TO
RELOAD
cDuring con 50 E215 World
cAfter CON 50 E215 E214 AFTER TRANSIT
CR E215 DRYCARGO 100 -30 RETURN 30 DRY CARGO SHIPS TO POOL
DAY N+58
cBefor CON 50 E215 E216 AVAIL AFTER N+58
eBase E216 816855964 817115164 5 LOAD DRY CARGO SHIPS FOR
NEXT TRIP, 3 DAYS
cDuring con 50 E216 World
cAfter CON 50 E216 E215 AVAIL AFTER N+58
CR E216 DRYCARGO 100 30 SEND 30 DRY CARGO = 630K TONS CARGO
cBefor CON 50 E216 E217 AFTER LOADING
eBase E217 817115165 818065565 5 IN TRANSIT, 11 DAYS, TO KOREA
FROM WEST COAST
cDuring con 50 E217 World
cAfter CON 50 E217 E216 AFTER LOADING
cBefor CON 50 E217 E218 AFTER TRANSIT
eBase E218 818065566 818324766 5 UNLOAD DRY CARGO SHIPS, 3
DAYS
cDuring con 50 E218 World
cAfter CON 50 E218 E217 AFTER TRANSIT

Genetic Algorithm Output

cBefore CON 50 E218 E219 AFTER UNLOADING
cBefore CON 50 E219 E220 AFTER UNLOADING
eBase E219 819275168 819361568 5 DRY CARGO SHIP'S 2ND CARGO
AVAIL DAY N+75
cDuring con 50 E219 World
cAfter CON 50 E219 E218 AFTER UNLOADING
CR E219 AMMO 100 -378000 378K TONS AMMO (60% OF CARGO)
CR E219 OTHER 100 -252000 252K TONS OTHER (40% OF CARGO)
eBase E220 818324767 819275167 5 RETURN TRIP, 11 DAYS
cDuring con 50 E220 World
cAfter CON 50 E220 E218 AFTER UNLOADING
cBefore CON 50 E220 E221 AFTER TRANSIT
eBase E221 819275168 819361568 5 DRY CARGO SHIPS AVAIL TO
RELOAD
cDuring con 50 E221 World
cAfter CON 50 E221 E220 AFTER TRANSIT
CR E221 DRYCARGO 100 -30 RETURN 30 DRY CARGO SHIP TO POOL DAY
N+86
eBase E240 813313559 813745559 5 LOAD RRF CARGO SHIPS, 5
DAYS
cDuring con 50 E240 World
cAfter CON 50 E240 E10 AFTER RRF CARGO SHIPS ARE AVAIL @ N+10
CR E240 RRF CARGO 100 45 SEND 45 RRF CARGO = 504K TONS CARGO
cBefore CON 50 E240 E241 AFTER LOADING
eBase E241 813745560 814782360 5 IN TRANSIT, 12 DAYS, TO KOREA
FROM WEST COAST
cDuring con 50 E241 World
cAfter CON 50 E241 E240 AFTER LOADING
cBefore CON 50 E241 E242 AFTER TRANSIT
eBase E242 814782361 815214361 5 UNLOAD RRF CARGO SHIPS, 5
DAYS
cDuring con 50 E242 World
cAfter CON 50 E242 E241 AFTER TRANSIT
cBefore CON 50 E242 E243 AFTER UNLOADING
cBefore CON 50 E242 E244 AFTER UNLOADING
eBase E243 819275168 819361568 5 RRF CARGO SHIP'S CARGO
AVAIL DAY N+32
cDuring con 50 E243 World
cAfter CON 50 E243 E242 AFTER UNLOADING
CR E243 AMMO 100 -302400 302.4K TONS AMMO (60% OF CARGO)
CR E243 OTHER 100 -201600 201.6K TONS OTHER (40% OF CARGO)
eBase E244 815214362 816251162 5 RETURN TRIP, 12 DAYS
cDuring con 50 E244 World
cAfter CON 50 E244 E242 AFTER UNLOADING
cBefore CON 50 E244 E245 AFTER TRANSIT

Genetic Algorithm Output

eBase E245 816251163 816337563 5 RRF CARGO SHIPS AVAIL TO
RELOAD
cDuring con 50 E245 World
cAfter CON 50 E245 E244 AFTER TRANSIT
CR E245 RRFCARGO 100 -45 RETURN 45 RRF CARGO SHIPS TO POOL DAY
N+44
cBefor CON 50 E245 E246 AVAIL AFTER N+44
eBase E246 816337564 816769564 5 LOAD RRF CARGO SHIPS FOR
NEXT TRIP, 5 DAYS
cDuring con 50 E246 World
cAfter CON 50 E246 E245 AVAIL AFTER N+44
CR E246 RRFCARGO 100 45 SEND 45 RRF CARGO = 504K TONS CARGO
cBefor CON 50 E246 E247 AFTER LOADING
eBase E247 816769565 817806365 5 IN TRANSIT, 12 DAYS, TO KOREA
FROM WEST COAST
cDuring con 50 E247 World
cAfter CON 50 E247 E246 AFTER LOADING
cBefor CON 50 E247 E248 AFTER TRANSIT
eBase E248 817806366 818238366 5 UNLOAD RRF CARGO SHIPS, 5
DAYS
cDuring con 50 E248 World
cAfter CON 50 E248 E247 AFTER TRANSIT
cBefor CON 50 E248 E249 AFTER UNLOADING
cBefor CON 50 E248 E250 AFTER UNLOADING
eBase E249 819275168 819361568 5 RRF CARGO SHIP'S 2ND CARGO
AVAIL DAY N+66
cDuring con 50 E249 World
cAfter CON 50 E249 E248 AFTER UNLOADING
CR E249 AMMO 100 -302400 302.4K TONS AMMO (60% OF CARGO)
CR E249 OTHER 100 -201600 201.6K TONS OTHER (40% OF CARGO)
eBase E250 818238367 819275167 5 RETURN TRIP, 12 DAYS
cDuring con 50 E250 World
cAfter CON 50 E250 E248 AFTER UNLOADING
cBefor CON 50 E250 E251 AFTER TRANSIT
eBase E251 819275168 819361568 5 RRF CARGO SHIPS AVAIL TO
RELOAD
cDuring con 50 E251 World
cAfter CON 50 E251 E250 AFTER TRANSIT
CR E251 RRFCARGO 100 -45 RETURN 45 RRF CARGO SHIP TO POOL DAY
N+86

Genetic Algorithm Output

RD C141 210 210 C-141 CARGO PLANES @ 45 TONS EACH
RD C5 100 100 C-5 CARGO PLANES @ 101 TONS EACH
RD C17 20 20 C-17 CARGO PLANES @ 86 TONS EACH
RD CRAF 30 30 CRAF CARGO PLANES @ 70 TONS EACH
RD PAX 34 34 C-141 PAX PLANES @ 200 EACH
RD RRFFAST 0 NO FAST SEALIFT SHIPS AVAIL @ N-DAY
RD RRFCARGO 0 NO RRF CARGO SHIPS AVAIL @ N-DAY
RD RORO 0 NO RO-RO SHIPS AVAIL @ N-DAY
RD DRYCARGO 0 NO DRY CARGO SHIPS AVAIL @ N-DAY
RD TANKER 0 NO TANKER SHIPS AVAIL @ N-DAY
RD AMMO 120000 120K TONS AMMO ON SITE @ N-DAY
RD POL 83330 83.33K GAL POL ON SITE @ N-DAY
RD OTHER 149000 149K TONS OTHER SUPPLIES ON SITE @ N-DAY
RD PAXEAST 0 PAX ON EAST COAST TO BE MOVED
RD EQUIPEAST 0 EQUIPMENT ON EAST COAST TO BE MOVED
RD PAXGULF 0 PAX ON GULF COAST TO BE MOVED
RD EQUIPGULF 0 EQUIPMENT ON GULF COAST TO BE MOVED
RD PAXWEST 0 PAX ON WEST COAST TO BE MOVED
RD EQUIPWEST 0 EQUIPMENT ON WEST COAST TO BE MOVED
eLocked World 819275223 824459223 10
eLocked E1 819275223 819361623 5 NOTIFICATION OF
MOBILIZATION (N-DAY)
cBefor CON 50 E1 E5 MOBILIZE AIRLIFT AFTER N-DAY
cBefor CON 50 E1 E6 MOBILIZE SEALIFT AFTER N-DAY
cBefor CON 50 E1 E7 MOBILIZE CRAF, PHASE I, AFTER N-DAY
cBefor CON 50 E1 E20 AFTER NOTIFICATION
cBefor CON 50 E1 E21 AFTER NOTIFICATION
cBefor CON 50 E1 E22 AFTER NOTIFICATION
cBefor CON 50 E1 E23 AFTER NOTIFICATION
eLocked E2 819275223 819707223 5 N+5
cStartWith CON 100 E2 E1
cStartWith CON 100 E2 E1
cStartWith CON 100 E2 E1
cBefor CON 50 E2 E9 FAST SEALIFT AVAIL @ N+5
eLocked E3 819275223 820139223 5 N+10
cStartWith CON 100 E3 E1
cStartWith CON 100 E3 E1
cStartWith CON 100 E3 E1
cBefor CON 50 E3 E10 RRF CARGO AVAIL @ N+10
cBefor CON 50 E3 E11 RRF RO-RO AVAIL @ N+10
cBefor CON 50 E3 E16 RRF TANKERS AVAIL @ N+10
eLocked E4 819275223 821867223 5 N+30
cStartWith CON 100 E4 E1
cStartWith CON 100 E4 E1
cStartWith CON 100 E4 E1

Genetic Algorithm Output

cBefor CON 50 E4 E8 BEGIN PHASE II OF CRAF @ N+30
cBefor CON 50 E4 E12 MSC RO-RO AVAIL @ N+30
cBefor CON 50 E4 E13 US FLAG RO-RO AVAIL @ N+30
cBefor CON 50 E4 E14 MSC DRY CARGO AVAIL @ N+30
cBefor CON 50 E4 E15 US FLAG DRY CARGO AVAIL @ N+30
cBefor CON 50 E4 E17 MSC TANKERS AVAIL @ N+30
cBefor CON 50 E4 E18 US FLAG TANKER AVAIL @ N+30
eBase E5 819406294 819492694 5 MOBILIZE AIRLIFT
cDuring con 50 E5 World
cAfter CON 50 E5 E1 MOBILIZE AIRLIFT AFTER N-DAY
eBase E6 819406294 819492694 5 MOBILIZE SEALIFT
cDuring con 50 E6 World
cAfter CON 50 E6 E1 MOBILIZE SEALIFT AFTER N-DAY
eBase E7 819361624 819448024 5 MOBILIZE CRAF PHASE I
cDuring con 50 E7 World
cAfter CON 50 E7 E1 MOBILIZE CRAF, PHASE I, AFTER N-DAY
CR E7 PAX 100 -18 CRAF I, ADDS 18 PAX PLANES @ 200 EACH
eBase E8 819275228 819361628 5 BEGIN PHASE II OF CRAF
cDuring con 50 E8 World
cAfter CON 50 E8 E4 BEGIN PHASE II OF CRAF @ N+30
CR E8 PAX 100 -67 CRAF II, ADDS 67 PAX PLANES @ 200 EACH
CR E8 CRAF 100 -19 CRAF II, ADDS 19 CARGO PLANES @ 70 TONS EACH
eBase E9 819275228 819361628 5 FAST SEALIFT SHIPS AVAIL
cDuring con 50 E9 World
cAfter CON 50 E9 E2 FAST SEALIFT AVAIL @ N+5
CR E9 RRFFAST 100 -13 13 CARGO SHIPS @ 20.3K TONS, 30 KTS
cBefor CON 50 E9 E150 AFTER FAST SEALIFTS ARE AVAIL @ N+5
eBase E10 819275228 819361628 5 RRF CARGO SHIPS AVAIL
cDuring con 50 E10 World
cAfter CON 50 E10 E3 RRF CARGO AVAIL @ N+10
CR E10 RRFCARGO 100 -45 45 CARGO SHIPS AVAIL @ 11.2K TONS, 17.3 KTS
cBefor CON 50 E10 E240 AFTER RRF CARGO SHIPS ARE AVAIL @ N+10
eBase E11 819275228 819361628 5 RRF RO-RO SHIPS AVAIL
cDuring con 50 E11 World
cAfter CON 50 E11 E3 RRF RO-RO AVAIL @ N+10
CR E11 RORO 100 -13 13 RO-RO SHIPS @ 15.3K TONS, 19.5 KTS
cBefor CON 50 E11 E180 AFTER RO-ROS ARE AVAIL @ N+10
eBase E12 819275228 819361628 5 MSC RO-RO SHIPS AVAIL
cDuring con 50 E12 World
cAfter CON 50 E12 E4 MSC RO-RO AVAIL @ N+30
CR E12 RORO 100 -4 4 MORE RO-RO SHIPS @ 15.3K TONS, 19.5 KTS
eBase E13 819275228 819361628 5 US FLAG RO-RO SHIPS AVAIL
cDuring con 50 E13 World

Genetic Algorithm Output

cAfter CON 50 E13 E4 US FLAG RO-RO AVAIL @ N+30
CR E13 RO-RO 100 -4 4 MORE RO-RO SHIPS @ 15.3K TONS, 19.5 KTS
eBase E14 819275228 819361628 5 MSC DRY CARGO SHIPS AVAIL
cDuring con 50 E14 World
cAfter CON 50 E14 E4 MSC DRY CARGO AVAIL @ N+30
CR E14 DRYCARGO 100 -6 6 DRY CARGO SHIPS @ 21K TONS, 20 KTS
eBase E15 819275228 819361628 5 US FLAG DRY CARGO SHIPS
AVAIL
cDuring con 50 E15 World
cAfter CON 50 E15 E4 US FLAG DRY CARGO AVAIL @ N+30
CR E15 DRYCARGO 100 -24 24 MORE DRY CARGO SHIPS @ 21K TONS, 20
KTS
cBefor CON 50 E15 E210 AFTER DRY CARGO SHIPS ARE AVAIL @ N+30
eBase E16 819275228 819361628 5 RRF TANKERS AVAIL
cDuring con 50 E16 World
cAfter CON 50 E16 E3 RRF TANKERS AVAIL @ N+10
CR E16 TANKER 100 -10 10 TANKERS AVAIL @ 27.5K GAL, 20 KTS
cBefor CON 50 E16 E120 AFTER TANKERS ARE AVAIL @ N+10
eBase E17 819275228 819361628 5 MSC TANKERS AVAIL
cDuring con 50 E17 World
cAfter CON 50 E17 E4 MSC TANKERS AVAIL @ N+30
CR E17 TANKER 100 -15 15 MORE TANKERS AVAIL @ 27.5K GAL, 20
KTS
eBase E18 819275228 819361628 5 US FLAG TANKERS AVAIL
cDuring con 50 E18 World
cAfter CON 50 E18 E4 US FLAG TANKER AVAIL @ N+30
CR E18 TANKER 100 -33 33 MORE TANKERS AVAIL @ 27.5K GAL, 20
KTS
eBase E20 819361629 819448029 5 MOBILIZE BOMBER WING #2,
EAST COAST, N+1
cDuring con 50 E20 World
cAfter CON 50 E20 E1 AFTER NOTIFICATION
CR E20 PAXEAST 100 -3300 3300 PAX TO MOVE FROM EAST COAST
CR E20 EQUIPEAST 100 -4000 4.0K TONS OF EQUIP TO MOVE FROM EAST
COAST
cBefor CON 50 E20 E50 AFTER MOBILIZATION
eBase E21 819439064 819525464 5 MOBILIZE BOMBER WING #3,
GULF COAST, N+1
cDuring con 50 E21 World
cAfter CON 50 E21 E1 AFTER NOTIFICATION
CR E21 PAXGULF 100 -3300 3300 PAX TO MOVE FROM EAST COAST
CR E21 EQUIPGULF 100 -4000 4.0K TONS OF EQUIP TO MOVE FROM EAST
COAST
cBefor CON 50 E21 E30 AFTER MOBILIZATION

Genetic Algorithm Output

eBase E22 819275228 819361628 5 MOBILIZE FIGHTER WING #2,
WEST COAST, N+1
cDuring con 50 E22 World
cAfter CON 50 E22 E1 AFTER NOTIFICATION
CR E22 PAXWEST 100 -3300 3300 PAX TO BE MOVED FROM WEST COAST
CR E22 EQUIPEAST 100 -4000 3300 PAX TO MOVE FROM EAST COAST
cBefor CON 50 E22 E60 AFTER MOBILIZATION
eBase E23 819439064 819525464 5 MOBILIZE FIGHTER WING #3,
GULF COAST, N+1
cDuring con 50 E23 World
cAfter CON 50 E23 E1 AFTER NOTIFICATION
CR E23 PAXGULF 100 -3300 ADD 3300 PAX TO MOVE FROM GULF COAST
CR E23 EQUIPGULF 100 -4000 ADD 4.0K TONS OF EQUIP TO MOVE FROM
EAST COAST
cBefor CON 50 E23 E40 AFTER MOBILIZATION
eBase E30 819307988 819394388 5 LOAD BOMBER WING #3, 1 DAY,
GULF COAST, N+2
cDuring con 50 E30 World
cAfter CON 50 E30 E21 AFTER MOBILIZATION
CR E30 C5 100 40 USE 40 C-5'S
CR E30 EQUIPGULF 100 4000 TO MOVE BW3'S 4.0K TONS OF EQUIPMENT
CR E30 PAX 100 17 USE 17 PAX PLANES
CR E30 PAXGULF 100 3300 TO MOVE BW3'S 3300 PERSONNEL
cBefor CON 50 E30 E31 AFTER LOAD
eBase E31 819283414 819369814 5 TRANSIT TIME TO KOREA, 1 DAY
cDuring con 50 E31 World
cAfter CON 50 E31 E30 AFTER LOAD
cBefor CON 50 E31 E32 AFTER TRANSIT
eBase E32 819373527 819459927 5 UNLOAD BW3, 1 DAY, N+4
cDuring con 50 E32 World
cAfter CON 50 E32 E31 AFTER TRANSIT
cBefor CON 50 E32 E33 AFTER UNLOAD
cBefor CON 5 E32 E35 AFTER UNLOAD
eBase E33 819275223 819534423 5 ASSEMBLE UNIT, 3 DAYS
cDuring con 50 E33 World
cAfter CON 50 E33 E32 AFTER UNLOAD
cBefor CON 50 E33 E34 AFTER ASSEMBLE
eBase E34 819537366 819623766 5 BW3 EQUIPMENT AND
PERSONNEL IN PLACE @ N+7
cDuring con 50 E34 World
cAfter CON 50 E34 E33 AFTER ASSEMBLE
eBase E35 819471829 819558229 5 AIRCRAFT RETURN TRANSIT TO
US, 1 DAY
cDuring con 50 E35 World
cAfter CON 5 E35 E32 AFTER UNLOAD

Genetic Algorithm Output

cBefor CON 5 E35 E36 AFTER TRANSIT
eBase E36 819275228 819361628 5 AIRCRAFT AVAILABLE, N+5
cDuring con 50 E36 World
cAfter CON 5 E36 E35 AFTER TRANSIT
CR E36 C5 100 -40 40 C-5 RETURNED TO THE POOL
CR E36 PAX 100 -17 17 PAX PLANES RETURNED TO THE POOL
eBase E40 819307988 819394388 5 LOAD FIGHTER WIND #3, 1 DAY,
GULF COAST, N+2
cDuring con 50 E40 World
cAfter CON 50 E40 E23 AFTER MOBILIZATION
CR E40 C5 100 40 USE 40 C-5'S
CR E40 EQUIPGULF 100 4000 TO MOVE FW3'S 4.0K TONS OF EQUIPMENT
CR E40 PAX 100 17 USE 17 PAX PLANES
CR E40 PAXGULF 100 3300 TO MOVE FW3'S 3300 PERSONNEL
cBefor CON 50 E40 E41 AFTER LOAD
eBase E41 819283414 819369814 5 TRANSIT TIME TO KOREA, 1 DAY
cDuring con 50 E41 World
cAfter CON 50 E41 E40 AFTER LOAD
cBefor CON 50 E41 E42 AFTER TRANSIT
eBase E42 819373527 819459927 5 UNLOAD FW3, 1 DAY, N+4
cDuring con 50 E42 World
cAfter CON 50 E42 E41 AFTER TRANSIT
cBefor CON 50 E42 E43 AFTER UNLOAD
cBefor CON 5 E42 E45 AFTER UNLOAD
eBase E43 819275223 819534423 5 ASSEMBLE UNIT, 3 DAYS
cDuring con 50 E43 World
cAfter CON 50 E43 E42 AFTER UNLOAD
cBefor CON 50 E43 E44 AFTER ASSEMBLE
eBase E44 819537366 819623766 5 FW3 EQUIPMENT AND
PERSONNEL IN PLACE @ N+7
cDuring con 50 E44 World
cAfter CON 50 E44 E43 AFTER ASSEMBLE
eBase E45 819471829 819558229 5 AIRCRAFT RETURN TRANSIT TO
US, 1 DAY
cDuring con 50 E45 World
cAfter CON 5 E45 E42 AFTER UNLOAD
cBefor CON 5 E45 E46 AFTER TRANSIT
eBase E46 819275228 819361628 5 AIRCRAFT AVAILABLE, N+5
cDuring con 50 E46 World
cAfter CON 5 E46 E45 AFTER TRANSIT
CR E46 C5 100 -40 40 C-5 RETURNED TO THE POOL
CR E46 PAX 100 -17 17 PAX PLANES RETURNED TO THE POOL
eBase E50 819275228 819361628 5 LOAD BOMBER WING #2, 1 DAY,
EAST COAST, N+2
cDuring con 50 E50 World

Genetic Algorithm Output

cAfter CON 50 E50 E20 AFTER MOBILIZATION
 CR E50 C5 100 20 USE 20 C-5'S AND
 CR E50 C141 100 45 USE 45 C-141'S
 CR E50 EQUIPEAST 100 4000 TO MOVE BW2'S 4.0K TONS OF EQUIPMENT
 CR E50 PAX 100 17 USE 17 PAX PLANES
 CR E50 PAXEAST 100 3300 TO MOVE BW2'S 3300 PERSONNEL
 cBefor CON 50 E50 E51 AFTER LOAD
 eBase E51 819283414 819369814 5 TRANSIT TIME TO KOREA, 1 DAY
 cDuring con 50 E51 World
 cAfter CON 50 E51 E50 AFTER LOAD
 cBefor CON 50 E51 E52 AFTER TRANSIT
 eBase E52 819373527 819459927 5 UNLOAD BW2, 1 DAY, N+4
 cDuring con 50 E52 World
 cAfter CON 50 E52 E51 AFTER TRANSIT
 cBefor CON 50 E52 E53 AFTER UNLOAD
 cBefor CON 5 E52 E55 AFTER UNLOAD
 eBase E53 819275223 819534423 5 ASSEMBLE UNIT, 3 DAYS
 cDuring con 50 E53 World
 cAfter CON 50 E53 E52 AFTER UNLOAD
 cBefor CON 50 E53 E54 AFTER ASSEMBLE
 eBase E54 819537366 819623766 5 BW2'S EQUIPMENT AND
 PERSONNEL IN PLACE @ N+7
 cDuring con 50 E54 World
 cAfter CON 50 E54 E53 AFTER ASSEMBLE
 eBase E55 819471829 819558229 5 AIRCRAFT RETURN TRANSIT TO
 US, 1 DAY
 cDuring con 50 E55 World
 cAfter CON 5 E55 E52 AFTER UNLOAD
 cBefor CON 5 E55 E56 AFTER TRANSIT
 eBase E56 819307988 819394388 5 AIRCRAFT AVAILABLE, N+5
 cDuring con 50 E56 World
 cAfter CON 5 E56 E55 AFTER TRANSIT
 CR E56 C5 100 -20 20 C-5 RETURNED TO THE POOL
 CR E56 C141 100 -45 45 C-141 RETURNED TO THE POOL
 CR E56 PAX 100 -17 17 PAX PLANES RETURNED TO THE POOL
 eBase E60 819406294 819751894 5 WAIT FOR AIRCRAFT
 AVAILABILITY, 4 DAYS
 cDuring con 50 E60 World
 cAfter CON 50 E60 E22 AFTER MOBILIZATION
 cBefor CON 50 E60 E61 AFTER WAIT
 eBase E61 819799506 819885906 5 LOAD FIGHTER WIND #2, 1 DAY,
 WEST COAST, N+6
 cDuring con 50 E61 World
 cAfter CON 50 E61 E60 AFTER WAIT
 CR E61 C141 100 89 USE 89 C-141'S

Genetic Algorithm Output

CR E61 EQUIPWEST 100 4000 TO MOVE FW2'S 4.0K TONS OF EQUIPMENT
 CR E61 PAX 100 17 USE 17 PAX PLANES
 CR E61 PAXWEST 100 3300 TO MOVE FW2'S 3300 PERSONNEL
 cBefor CON 50 E61 E62 AFTER LOAD
 eBase E62 819307990 819394390 5 TRANSIT TIME TO KOREA, 1 DAY
 cDuring con 50 E62 World
 cAfter CON 50 E62 E61 AFTER LOAD
 cBefor CON 50 E62 E63 AFTER TRANSIT
 eBase E63 819406294 819492694 5 UNLOAD FW2, 1 DAY, N+8
 cDuring con 50 E63 World
 cAfter CON 50 E63 E62 AFTER TRANSIT
 cBefor CON 50 E63 E64 AFTER UNLOAD
 eBase E64 819275223 819534423 5 ASSEMBLE UNIT, 3 DAYS
 cDuring con 50 E64 World
 cAfter CON 50 E64 E63 AFTER UNLOAD
 cBefor CON 50 E64 E65 AFTER ASSEMBLE
 eBase E65 819537366 819623766 5 FW2 EQUIPMENT AND
 PERSONNEL IN PLACE @ N+11
 cDuring con 50 E65 World
 cAfter CON 50 E65 E64 AFTER ASSEMBLE
 cBefor CON 50 E65 E66 AFTER UNLOAD
 eBase E66 819668437 819754837 5 AIRCRAFT RETURN TRANSIT TO
 US, 1 DAY
 cDuring con 50 E66 World
 cAfter CON 50 E66 E65 AFTER UNLOAD
 cBefor CON 50 E66 E67 AFTER TRANSIT
 eBase E67 819275228 819361628 5 AIRCRAFT AVAILABLE, N+9
 cDuring con 50 E67 World
 cAfter CON 50 E67 E66 AFTER TRANSIT
 CR E67 C141 100 -89 89 C-141 RETURNED TO THE POOL
 CR E67 PAX 100 -17 17 PAX PLANES RETURNED TO THE POOL
 eBase E120 819275228 819534428 5 LOAD TANKERS, 3 DAYS
 cDuring con 50 E120 World
 cAfter CON 50 E120 E16 AFTER TANKERS ARE AVAIL @ N+10
 CR E120 TANKER 100 10 SEND ALL 10 TANKERS = 275K GAL POL
 cBefor CON 50 E120 E121 AFTER LOADING
 eBase E121 819537366 820487766 5 IN TRANSIT, 11 DAYS, TO KOREA
 FROM WEST COAST
 cDuring con 50 E121 World
 cAfter CON 50 E121 E120 AFTER LOADING
 cBefor CON 50 E121 E122 AFTER TRANSIT
 eBase E122 819275223 819534423 5 UNLOAD TANKERS, 3 DAYS
 cDuring con 50 E122 World
 cAfter CON 50 E122 E121 AFTER TRANSIT
 cBefor CON 50 E122 E123 AFTER UNLOADING

Genetic Algorithm Output

cBefor CON 50 E122 E124 AFTER UNLOADING
eBase E123 819340762 819427162 5 TANKER'S CARGO AVAIL DAY
N+27
cDuring con 50 E123 World
cAfter CON 50 E123 E122 AFTER UNLOADING
CR E123 POL 100 -275000 27.5K GALS/TANKER ADDED TO SUPPLY IN
KOREA
eBase E124 819537366 820487766 5 RETURN TRIP FOR TANKER, 11
DAYS
cDuring con 50 E124 World
cAfter CON 50 E124 E122 AFTER UNLOADING
cBefor CON 50 E124 E125 AFTER TRANSIT
eBase E125 819275228 819361628 5 TANKER AVAIL
cDuring con 50 E125 World
cAfter CON 50 E125 E124 AFTER TRANSIT
CR E125 TANKER 100 -10 RETURN 10 TANKERS TO POOL DAY N+38
cBefor CON 50 E125 E126 1ST 10 HAVE RETURN + 38 MORE SHOULD BE
AVAIL
eBase E126 819275228 819534428 5 LOAD TANKERS FOR NEXT TRIP
3 DAYS
cDuring con 50 E126 World
cAfter CON 50 E126 E125 1ST 10 HAVE RETURN + 38 MORE SHOULD BE
AVAIL
CR E126 TANKER 100 58 SEND ALL 58 TANKERS = 1595K GAL POL
cBefor CON 50 E126 E127 AFTER LOADING
eBase E127 819537366 820487766 5 IN TRANSIT, 11 DAYS, TO KOREA
FROM WEST COAST
cDuring con 50 E127 World
cAfter CON 50 E127 E126 AFTER LOADING
cBefor CON 50 E127 E128 AFTER TRANSIT
eBase E128 819275223 819534423 5 UNLOAD TANKERS, 3 DAYS
cDuring con 50 E128 World
cAfter CON 50 E128 E127 AFTER TRANSIT
cBefor CON 50 E128 E129 AFTER UNLOADING
cBefor CON 50 E128 E130 AFTER UNLOADING
eBase E129 819340762 819427162 5 TANKER'S CARGO AVAIL DAY
N+55
cDuring con 50 E129 World
cAfter CON 50 E129 E128 AFTER UNLOADING
CR E129 POL 100 -1.595e+006 27.5K GALS/TANKER ADDED TO SUPPLY IN
KOREA
eBase E130 819537366 820487766 5 RETURN TRIP FOR TANKER, 11
DAYS
cDuring con 50 E130 World
cAfter CON 50 E130 E128 AFTER UNLOADING

Genetic Algorithm Output

cBefor CON 50 E130 E131 AFTER RETURN TRANSIT
eBase E131 819275228 819361628 5 TANKERS AVAIL TO RELOAD
cDuring con 50 E131 World
cAfter CON 50 E131 E130 AFTER RETURN TRANSIT
CR E131 TANKER 100 -58 RETURN 58 TANKERS TO POOL DAY N+66
eBase E150 819275228 819534428 5 LOAD FAST SEALIFT, 3 DAYS
cDuring con 50 E150 World
cAfter CON 50 E150 E9 AFTER FAST SEALIFTS ARE AVAIL @ N+5
CR E150 RRFFAST 100 10 SEND ALL 10 FAST SEALIFTS = 203K TONS
CARGO
cBefor CON 50 E150 E151 AFTER LOADING
eBase E151 819537366 820142166 5 IN TRANSIT, 7 DAYS, TO KOREA
FROM WEST COAST
cDuring con 50 E151 World
cAfter CON 50 E151 E150 AFTER LOADING
cBefor CON 50 E151 E152 AFTER TRANSIT
eBase E152 819275223 819534423 5 UNLOAD FAST SEALIFTS, 3 DAYS
cDuring con 50 E152 World
cAfter CON 50 E152 E151 AFTER TRANSIT
cBefor CON 50 E152 E153 AFTER UNLOADING
cBefor CON 50 E152 E154 AFTER UNLOADING
eBase E153 819275228 819361628 5 FAST SEALIFT'S CARGO AVAIL
DAY N+18
cDuring con 50 E153 World
cAfter CON 50 E153 E152 AFTER UNLOADING
CR E153 AMMO 100 -121800 121.8K TONS AMMO (60% OF CARGO)
CR E153 OTHER 100 -81200 81.2K TONS OTHER (40% OF CARGO)
eBase E154 819537366 820142166 5 RETURN TRIP, 7 DAYS
cDuring con 50 E154 World
cAfter CON 50 E154 E152 AFTER UNLOADING
cBefor CON 50 E154 E155 AFTER TRANSIT
eBase E155 819275228 819361628 5 FAST SEALIFTS AVAIL TO
RELOAD
cDuring con 50 E155 World
cAfter CON 50 E155 E154 AFTER TRANSIT
CR E155 RRFFAST 100 -10 RETURN 10 FAST SEALIFTS TO POOL DAY
N+25
cBefor CON 50 E155 E156 AFTER FAST SEALIFTS ARE AVAIL @ N+25
eBase E156 819275228 819534428 5 LOAD FAST SEALIFT FOR NEXT
TRIP, 3 DAYS
cDuring con 50 E156 World
cAfter CON 50 E156 E155 AFTER FAST SEALIFTS ARE AVAIL @ N+25
CR E156 RRFFAST 100 10 SEND ALL 10 FAST SEALIFTS = 203K TONS
CARGO
cBefor CON 50 E156 E157 AFTER LOADING

Genetic Algorithm Output

eBase E157 819537366 820142166 5 IN TRANSIT, 7 DAYS, TO KOREA
FROM WEST COAST
cDuring con 50 E157 World
cAfter CON 50 E157 E156 AFTER LOADING
cBefor CON 50 E157 E158 AFTER TRANSIT
eBase E158 819275223 819534423 5 UNLOAD FAST SEALIFTS, 3 DAYS
cDuring con 50 E158 World
cAfter CON 50 E158 E157 AFTER TRANSIT
cBefor CON 50 E158 E159 AFTER UNLOADING
cBefor CON 50 E158 E160 AFTER UNLOADING
eBase E159 819275228 819361628 5 FAST SEALIFT'S 2ND CARGO
AVAIL DAY N+38
cDuring con 50 E159 World
cAfter CON 50 E159 E158 AFTER UNLOADING
CR E159 AMMO 100 -121800 121.8K TONS AMMO (60% OF CARGO)
CR E159 OTHER 100 -81200 81.2K TONS OTHER (40% OF CARGO)
eBase E160 819537366 820142166 5 RETURN TRIP, 7 DAYS
cDuring con 50 E160 World
cAfter CON 50 E160 E158 AFTER UNLOADING
cBefor CON 50 E160 E161 AFTER TRANSIT
eBase E161 819283414 819369814 5 FAST SEALIFTS AVAIL TO
RELOAD
cDuring con 50 E161 World
cAfter CON 50 E161 E160 AFTER TRANSIT
CR E161 RRFFAST 100 -10 RETURN 10 FAST SEALIFTS TO POOL DAY
N+45
eBase E180 819275228 819534428 5 LOAD RO-ROS, 3 DAYS
cDuring con 50 E180 World
cAfter CON 50 E180 E11 AFTER RO-ROS ARE AVAIL @ N+10
CR E180 RORO 100 13 SEND ALL 13 RO-ROS = 198.9K TONS CARGO
cBefor CON 50 E180 E181 AFTER LOADING
eBase E181 819537366 820487766 5 IN TRANSIT, 11 DAYS, TO KOREA
FROM WEST COAST
cDuring con 50 E181 World
cAfter CON 50 E181 E180 AFTER LOADING
cBefor CON 50 E181 E182 AFTER TRANSIT
eBase E182 819275223 819534423 5 UNLOAD RO-ROS, 3 DAYS
cDuring con 50 E182 World
cAfter CON 50 E182 E181 AFTER TRANSIT
cBefor CON 50 E182 E183 AFTER UNLOADING
cBefor CON 50 E182 E184 AFTER UNLOADING
eBase E183 819275228 819361628 5 RO-RO'S CARGO AVAIL DAY
N+27
cDuring con 50 E183 World
cAfter CON 50 E183 E182 AFTER UNLOADING

Genetic Algorithm Output

CR E183 AMMO 100 -119300 119.3K TONS AMMO (60% OF CARGO)
CR E183 OTHER 100 -79600 79.6K TONS OTHER (40% OF CARGO)
eBase E184 819537366 820487766 5 RETURN TRIP, 11 DAYS
cDuring con 50 E184 World
cAfter CON 50 E184 E182 AFTER UNLOADING
cBefor CON 50 E184 E185 AFTER TRANSIT
eBase E185 819275228 819361628 5 RO-ROS AVAIL TO RELOAD
cDuring con 50 E185 World
cAfter CON 50 E185 E184 AFTER TRANSIT
CR E185 RORO 100 -13 RETURN 13 RO-ROS TO POOL DAY N+38
cBefor CON 50 E185 E186 1ST 13 HAVE RETURN + 8 MORE SHOULD BE AVAIL
eBase E186 819275228 819534428 5 LOAD RO-ROS FOR NEXT TRIP, 3
DAYS
cDuring con 50 E186 World
cAfter CON 50 E186 E185 1ST 13 HAVE RETURN + 8 MORE SHOULD BE AVAIL
CR E186 RORO 100 21 SEND ALL 21 RO-ROS = 321.3K TONS CARGO
cBefor CON 50 E186 E187 AFTER LOADING
eBase E187 819537366 820487766 5 IN TRANSIT, 11 DAYS, TO KOREA
FROM WEST COAST
cDuring con 50 E187 World
cAfter CON 50 E187 E186 AFTER LOADING
cBefor CON 50 E187 E188 AFTER TRANSIT
eBase E188 819275223 819534423 5 UNLOAD RO-ROS, 3 DAYS
cDuring con 50 E188 World
cAfter CON 50 E188 E187 AFTER TRANSIT
cBefor CON 50 E188 E189 AFTER UNLOADING
cBefor CON 50 E188 E190 AFTER UNLOADING
eBase E189 819275228 819361628 5 RO-RO'S 2ND CARGO AVAIL DAY
N+55
cDuring con 50 E189 World
cAfter CON 50 E189 E188 AFTER UNLOADING
CR E189 AMMO 100 -192800 192.8K TONS AMMO (60% OF CARGO)
CR E189 OTHER 100 -128500 128.5K TONS OTHER (40% OF CARGO)
eBase E190 819537366 820487766 5 RETURN TRIP, 11 DAYS
cDuring con 50 E190 World
cAfter CON 50 E190 E188 AFTER UNLOADING
cBefor CON 50 E190 E191 AFTER TRANSIT
eBase E191 819275228 819361628 5 RO-ROS AVAIL TO RELOAD
cDuring con 50 E191 World
cAfter CON 50 E191 E190 AFTER TRANSIT
CR E191 RORO 100 -21 RETURN 21 RO-ROS TO POOL DAY N+45
eBase E210 819275228 819534428 5 LOAD DRY CARGO SHIPS, 3
DAYS
cDuring con 50 E210 World
cAfter CON 50 E210 E15 AFTER DRY CARGO SHIPS ARE AVAIL @ N+30

Genetic Algorithm Output

CR E210 DRYCARGO 100 30 SEND 30 DRY CARGO = 630K TONS CARGO
cBefor CON 50 E210 E211 AFTER LOADING
eBase E211 819537366 820487766 5 IN TRANSIT, 11 DAYS, TO KOREA
FROM WEST COAST
cDuring con 50 E211 World
cAfter CON 50 E211 E210 AFTER LOADING
cBefor CON 50 E211 E212 AFTER TRANSIT
eBase E212 819275223 819534423 5 UNLOAD DRY CARGO SHIPS, 3
DAYS
cDuring con 50 E212 World
cAfter CON 50 E212 E211 AFTER TRANSIT
cBefor CON 50 E212 E213 AFTER UNLOADING
cBefor CON 50 E212 E214 AFTER UNLOADING
eBase E213 819275228 819361628 5 DRY CARGO SHIP'S CARGO
AVAIL DAY N+47
cDuring con 50 E213 World
cAfter CON 50 E213 E212 AFTER UNLOADING
CR E213 AMMO 100 -378000 378K TONS AMMO (60% OF CARGO)
CR E213 OTHER 100 -252000 252K TONS OTHER (40% OF CARGO)
eBase E214 819537366 820487766 5 RETURN TRIP, 11 DAYS
cDuring con 50 E214 World
cAfter CON 50 E214 E212 AFTER UNLOADING
cBefor CON 50 E214 E215 AFTER TRANSIT
eBase E215 819275228 819361628 5 DRY CARGO SHIPS AVAIL TO
RELOAD
cDuring con 50 E215 World
cAfter CON 50 E215 E214 AFTER TRANSIT
CR E215 DRYCARGO 100 -30 RETURN 30 DRY CARGO SHIPS TO POOL
DAY N+58
cBefor CON 50 E215 E216 AVAIL AFTER N+58
eBase E216 819275228 819534428 5 LOAD DRY CARGO SHIPS FOR
NEXT TRIP, 3 DAYS
cDuring con 50 E216 World
cAfter CON 50 E216 E215 AVAIL AFTER N+58
CR E216 DRYCARGO 100 30 SEND 30 DRY CARGO = 630K TONS CARGO
cBefor CON 50 E216 E217 AFTER LOADING
eBase E217 819537366 820487766 5 IN TRANSIT, 11 DAYS, TO KOREA
FROM WEST COAST
cDuring con 50 E217 World
cAfter CON 50 E217 E216 AFTER LOADING
cBefor CON 50 E217 E218 AFTER TRANSIT
eBase E218 819275223 819534423 5 UNLOAD DRY CARGO SHIPS, 3
DAYS
cDuring con 50 E218 World
cAfter CON 50 E218 E217 AFTER TRANSIT

Genetic Algorithm Output

cBefor CON 50 E218 E219 AFTER UNLOADING
cBefor CON 50 E218 E220 AFTER UNLOADING
eBase E219 819275228 819361628 5 DRY CARGO SHIP'S 2ND CARGO
AVAIL DAY N+75
cDuring con 50 E219 World
cAfter CON 50 E219 E218 AFTER UNLOADING
CR E219 AMMO 100 -378000 378K TONS AMMO (60% OF CARGO)
CR E219 OTHER 100 -252000 252K TONS OTHER (40% OF CARGO)
eBase E220 819537366 820487766 5 RETURN TRIP, 11 DAYS
cDuring con 50 E220 World
cAfter CON 50 E220 E218 AFTER UNLOADING
cBefor CON 50 E220 E221 AFTER TRANSIT
eBase E221 819275228 819361628 5 DRY CARGO SHIPS AVAIL TO
RELOAD
cDuring con 50 E221 World
cAfter CON 50 E221 E220 AFTER TRANSIT
CR E221 DRYCARGO 100 -30 RETURN 30 DRY CARGO SHIP TO POOL DAY
N+86
eBase E240 819365332 819797332 5 LOAD RRF CARGO SHIPS, 5
DAYS
cDuring con 50 E240 World
cAfter CON 50 E240 E10 AFTER RRF CARGO SHIPS ARE AVAIL @ N+10
CR E240 RRFCARGO 100 45 SEND 45 RRF CARGO = 504K TONS CARGO
cBefor CON 50 E240 E241 AFTER LOADING
eBase E241 819799510 820836310 5 IN TRANSIT, 12 DAYS, TO KOREA
FROM WEST COAST
cDuring con 50 E241 World
cAfter CON 50 E241 E240 AFTER LOADING
cBefor CON 50 E241 E242 AFTER TRANSIT
eBase E242 819275223 819707223 5 UNLOAD RRF CARGO SHIPS, 5
DAYS
cDuring con 50 E242 World
cAfter CON 50 E242 E241 AFTER TRANSIT
cBefor CON 50 E242 E243 AFTER UNLOADING
cBefor CON 50 E242 E244 AFTER UNLOADING
eBase E243 819275228 819361628 5 RRF CARGO SHIP'S CARGO
AVAIL DAY N+32
cDuring con 50 E243 World
cAfter CON 50 E243 E242 AFTER UNLOADING
CR E243 AMMO 100 -302400 302.4K TONS AMMO (60% OF CARGO)
CR E243 OTHER 100 -201600 201.6K TONS OTHER (40% OF CARGO)
eBase E244 819799510 820836310 5 RETURN TRIP, 12 DAYS
cDuring con 50 E244 World
cAfter CON 50 E244 E242 AFTER UNLOADING
cBefor CON 50 E244 E245 AFTER TRANSIT

Genetic Algorithm Output

eBase E245 819275228 819361628 5 RRF CARGO SHIPS AVAIL TO
RELOAD
cDuring con 50 E245 World
cAfter CON 50 E245 E244 AFTER TRANSIT
CR E245 RRFCARGO 100 -45 RETURN 45 RRF CARGO SHIPS TO POOL DAY
N+44
cBefor CON 50 E245 E246 AVAIL AFTER N+44
eBase E246 819365332 819797332 5 LOAD RRF CARGO SHIPS FOR
NEXT TRIP, 5 DAYS
cDuring con 50 E246 World
cAfter CON 50 E246 E245 AVAIL AFTER N+44
CR E246 RRFCARGO 100 45 SEND 45 RRF CARGO = 504K TONS CARGO
cBefor CON 50 E246 E247 AFTER LOADING
eBase E247 819799510 820836310 5 IN TRANSIT, 12 DAYS, TO KOREA
FROM WEST COAST
cDuring con 50 E247 World
cAfter CON 50 E247 E246 AFTER LOADING
cBefor CON 50 E247 E248 AFTER TRANSIT
eBase E248 819275223 819707223 5 ULOAD RRF CARGO SHIPS, 5
DAYS
cDuring con 50 E248 World
cAfter CON 50 E248 E247 AFTER TRANSIT
cBefor CON 50 E248 E249 AFTER UNLOADING
cBefor CON 50 E248 E250 AFTER UNLOADING
eBase E249 819275228 819361628 5 RRF CARGO SHIP'S 2ND CARGO
AVAIL DAY N+66
cDuring con 50 E249 World
cAfter CON 50 E249 E248 AFTER UNLOADING
CR E249 AMMO 100 -302400 302.4K TONS AMMO (60% OF CARGO)
CR E249 OTHER 100 -201600 201.6K TONS OTHER (40% OF CARGO)
eBase E250 819799510 820836310 5 RETURN TRIP, 12 DAYS
cDuring con 50 E250 World
cAfter CON 50 E250 E248 AFTER UNLOADING
cBefor CON 50 E250 E251 AFTER TRANSIT
eBase E251 819291606 819378006 5 RRF CARGO SHIPS AVAIL TO
RELOAD
cDuring con 50 E251 World
cAfter CON 50 E251 E250 AFTER TRANSIT
CR E251 RRFCARGO 100 -45 RETURN 45 RRF CARGO SHIP TO POOL DAY
N+86

Genetic Algorithm Output

RD 1 210	210 C-141 CARGO PLANES @ 45 TONS EACH
RD 100	100 C-5 CARGO PLANES @ 101 TONS EACH
RD 7 20	20 C-17 CARGO PLANES @ 86 TONS EACH
RD CRAF 30	30 CRAF CARGO PLANES @ 70 TONS EACH
RD PAX 34	34 C-141 PAX PLANES @ 200 EACH
RD RRFFAST 0	NO FAST SEALIFT SHIPS AVAIL @ N-DAY
RD RRFCARGO 0	NO RRF CARGO SHIPS AVAIL @ N-DAY
RD RORO 0	NO RO-RO SHIPS AVAIL @ N-DAY
RD DRYCARGO 0	NO DRY CARGO SHIPS AVAIL @ N-DAY
RD TANKER 0	NO TANKER SHIPS AVAIL @ N-DAY
RD AMMO 120000	120K TONS AMMO ON SITE @ N-DAY
RD POL 83330	83.33K GAL POL ON SITE @ N-DAY
RD OTHER 149000	149K TONS OTHER SUPPLIES ON SITE @ N-DAY
RD PAXEAST 0	PAX ON EAST COAST TO BE MOVED
RD EQUIPEAST 0	EQUIPMENT ON EAST COAST TO BE MOVED
RD PAXGULF 0	PAX ON GULF COAST TO BE MOVED
RD EQUIPGULF 0	EQUIPMENT ON GULF COAST TO BE MOVED
RD PAXWEST 0	PAX ON WEST COAST TO BE MOVED
RD EQUIPWEST 0	EQUIPMENT ON WEST COAST TO BE MOVED
eLocked World 819275289 824459289 10	
eLocked E1 819275289 819361689 5	NOTIFICATION OF
MOBILIZATION (N-DAY)	
cBefor CON 50 E1 E5 MOBILIZE AIRLIFT AFTER N-DAY	
cBefor CON 50 E1 E6 MOBILIZE SEALIFT AFTER N-DAY	
cBefor CON 50 E1 E7 MOBILIZE CRAF, PHASE I, AFTER N-DAY	
cBefor CON 50 E1 E20 AFTER NOTIFICATION	
cBefor CON 50 E1 E21 AFTER NOTIFICATION	
cBefor CON 50 E1 E22 AFTER NOTIFICATION	
cBefor CON 50 E1 E23 AFTER NOTIFICATION	
eLocked E2 819275289 819707289 5	N+5
cStartWith CON 100 E2 E1	
cStartWith CON 100 E2 E1	
cStartWith CON 100 E2 E1	
cBefor CON 50 E2 E9 FAST SEALIFT AVAIL @ N+5	
eLocked E3 819275289 820139289 5	N+10
cStartWith CON 100 E3 E1	
cStartWith CON 100 E3 E1	
cStartWith CON 100 E3 E1	
cBefor CON 50 E3 E10 RRF CARGO AVAIL @ N+10	
cBefor CON 50 E3 E11 RRF RO-RO AVAIL @ N+10	
cBefor CON 50 E3 E16 RRF TANKERS AVAIL @ N+10	
eLocked E4 819275289 821867289 5	N+30
cStartWith CON 100 E4 E1	
cStartWith CON 100 E4 E1	
cStartWith CON 100 E4 E1	

Genetic Algorithm Output

cBefor CON 50 E4 E8 BEGIN PHASE II OF CRAF @ N+30
cBefor CON 50 E4 E12 MSC RO-RO AVAIL @ N+30
cBefor CON 50 E4 E13 US FLAG RO-RO AVAIL @ N+30
cBefor CON 50 E4 E14 MSC DRY CARGO AVAIL @ N+30
cBefor CON 50 E4 E15 US FLAG DRY CARGO AVAIL @ N+30
cBefor CON 50 E4 E17 MSC TANKERS AVAIL @ N+30
cBefor CON 50 E4 E18 US FLAG TANKER AVAIL @ N+30
eBase E5 821687313 821773713 5 MOBILIZE AIRLIFT
cDuring con 50 E5 World
cAfter CON 50 E5 E1 MOBILIZE AIRLIFT AFTER N-DAY
eBase E6 821687318 821773718 5 MOBILIZE SEALIFT
cDuring con 50 E6 World
cAfter CON 50 E6 E1 MOBILIZE SEALIFT AFTER N-DAY
eBase E7 821687300 821773700 5 MOBILIZE CRAF PHASE I
cDuring con 50 E7 World
cAfter CON 50 E7 E1 MOBILIZE CRAF, PHASE I, AFTER N-DAY
CR E7 PAX 100 -18 CRAF I, ADDS 18 PAX PLANES @ 200 EACH
eBase E8 821687304 821773704 5 BEGIN PHASE II OF CRAF
cDuring con 50 E8 World
cAfter CON 50 E8 E4 BEGIN PHASE II OF CRAF @ N+30
CR E8 PAX 100 -67 CRAF II, ADDS 67 PAX PLANES @ 200 EACH
CR E8 CRAF 100 -19 CRAF II, ADDS 19 CARGO PLANES @ 70 TONS
EACH
eBase E9 821687310 821773710 5 FAST SEALIFT SHIPS AVAIL
cDuring con 50 E9 World
cAfter CON 50 E9 E2 FAST SEALIFT AVAIL @ N+5
CR E9 RRFFAST 100 -13 13 CARGO SHIPS @ 20.3K TONS, 30 KTS
cBefor CON 50 E9 E150 AFTER FAST SEALIFTS ARE AVAIL @ N+5
eBase E10 821687300 821773700 5 RRF CARGO SHIPS AVAIL
cDuring con 50 E10 World
cAfter CON 50 E10 E3 RRF CARGO AVAIL @ N+10
CR E10 RRFCARGO 100 -45 45 CARGO SHIPS AVAIL @ 11.2K TONS, 17.3
KTS
cBefor CON 50 E10 E240 AFTER RRF CARGO SHIPS ARE AVAIL @ N+10
eBase E11 821687304 821773704 5 RRF RO-RO SHIPS AVAIL
cDuring con 50 E11 World
cAfter CON 50 E11 E3 RRF RO-RO AVAIL @ N+10
CR E11 RORO 100 -13 13 RO-RO SHIPS @ 15.3K TONS, 19.5 KTS
cBefor CON 50 E11 E180 AFTER RO-ROS ARE AVAIL @ N+10
eBase E12 821687310 821773710 5 MSC RO-RO SHIPS AVAIL
cDuring con 50 E12 World
cAfter CON 50 E12 E4 MSC RO-RO AVAIL @ N+30
CR E12 RORO 100 -4 4 MORE RO-RO SHIPS @ 15.3K TONS, 19.5 KTS
eBase E13 821687302 821773702 5 US FLAG RO-RO SHIPS AVAIL
cDuring con 50 E13 World

Genetic Algorithm Output

cAfter CON 50 E13 E4 US FLAG RO-RO AVAIL @ N+30
CR E13 RORO 100 -4 4 MORE RO-RO SHIPS @ 15.3K TONS, 19.5 KTS
eBase E14 821687306 821773706 5 MSC DRY CARGO SHIPS AVAIL
cDuring con 50 E14 World
cAfter CON 50 E14 E4 MSC DRY CARGO AVAIL @ N+30
CR E14 DRYCARGO 100 -6 6 DRY CARGO SHIPS @ 21K TONS, 20 KTS
eBase E15 821687299 821773699 5 US FLAG DRY CARGO SHIPS
AVAIL
cDuring con 50 E15 World
cAfter CON 50 E15 E4 US FLAG DRY CARGO AVAIL @ N+30
CR E15 DRYCARGO 100 -24 24 MORE DRY CARGO SHIPS @ 21K TONS, 20
KTS
cBefor CON 50 E15 E210 AFTER DRY CARGO SHIPS ARE AVAIL @ N+30
eBase E16 821687317 821773717 5 RRF TANKERS AVAIL
cDuring con 50 E16 World
cAfter CON 50 E16 E3 RRF TANKERS AVAIL @ N+10
CR E16 TANKER 100 -10 10 TANKERS AVAIL @ 27.5K GAL, 20 KTS
cBefor CON 50 E16 E120 AFTER TANKERS ARE AVAIL @ N+10
eBase E17 821687318 821773718 5 MSC TANKERS AVAIL
cDuring con 50 E17 World
cAfter CON 50 E17 E4 MSC TANKERS AVAIL @ N+30
CR E17 TANKER 100 -15 15 MORE TANKERS AVAIL @ 27.5K GAL, 20
KTS
eBase E18 821687296 821773696 5 US FLAG TANKERS AVAIL
cDuring con 50 E18 World
cAfter CON 50 E18 E4 US FLAG TANKER AVAIL @ N+30
CR E18 TANKER 100 -33 33 MORE TANKERS AVAIL @ 27.5K GAL, 20
KTS
eBase E20 821687296 821773696 5 MOBILIZE BOMBER WING #2,
EAST COAST, N+1
cDuring con 50 E20 World
cAfter CON 50 E20 E1 AFTER NOTIFICATION
CR E20 PAXEAST 100 -3300 3300 PAX TO MOVE FROM EAST COAST
CR E20 EQUIPEAST 100 -4000 4.0K TONS OF EQUIP TO MOVE FROM EAST
COAST
cBefor CON 50 E20 E50 AFTER MOBILIZATION
eBase E21 821687304 821773704 5 MOBILIZE BOMBER WING #3,
GULF COAST, N+1
cDuring con 50 E21 World
cAfter CON 50 E21 E1 AFTER NOTIFICATION
CR E21 PAXGULF 100 -3300 3300 PAX TO MOVE FROM EAST COAST
CR E21 EQUIPGULF 100 -4000 4.0K TONS OF EQUIP TO MOVE FROM EAST
COAST
cBefor CON 50 E21 E30 AFTER MOBILIZATION

Genetic Algorithm Output

eBase E22 821687302 821773702 5 MOBILIZE FIGHTER WING #2,
WEST COAST, N+1
cDuring con 50 E22 World
cAfter CON 50 E22 E1 AFTER NOTIFICATION
CR E22 PAXWEST 100 -3300 3300 PAX TO BE MOVED FROM WEST COAST
CR E22 EQUIPEAST 100 -4000 3300 PAX TO MOVE FROM EAST COAST
cBefor CON 50 E22 E60 AFTER MOBILIZATION
eBase E23 821687299 821773699 5 MOBILIZE FIGHTER WING #3,
GULF COAST, N+1
cDuring con 50 E23 World
cAfter CON 50 E23 E1 AFTER NOTIFICATION
CR E23 PAXGULF 100 -3300 ADD 3300 PAX TO MOVE FROM GULF COAST
CR E23 EQUIPGULF 100 -4000 ADD 4.0K TONS OF EQUIP TO MOVE FROM
EAST COAST
cBefor CON 50 E23 E40 AFTER MOBILIZATION
eBase E30 821687316 821773716 5 LOAD BOMBER WING #3, 1 DAY,
GULF COAST, N+2
cDuring con 50 E30 World
cAfter CON 50 E30 E21 AFTER MOBILIZATION
CR E30 C5 100 40 USE 40 C-5'S
CR E30 EQUIPGULF 100 4000 TO MOVE BW3'S 4.0K TONS OF EQUIPMENT
CR E30 PAX 100 17 USE 17 PAX PLANES
CR E30 PAXGULF 100 3300 TO MOVE BW3'S 3300 PERSONNEL
cBefor CON 50 E30 E31 AFTER LOAD
eBase E31 821687296 821773696 5 TRANSIT TIME TO KOREA, 1 DAY
cDuring con 50 E31 World
cAfter CON 50 E31 E30 AFTER LOAD
cBefor CON 50 E31 E32 AFTER TRANSIT
eBase E32 821687304 821773704 5 UNLOAD BW3, 1 DAY, N+4
cDuring con 50 E32 World
cAfter CON 50 E32 E31 AFTER TRANSIT
cBefor CON 50 E32 E33 AFTER UNLOAD
cBefor CON 5 E32 E35 AFTER UNLOAD
eBase E33 821687298 821946498 5 ASSEMBLE UNIT, 3 DAYS
cDuring con 50 E33 World
cAfter CON 50 E33 E32 AFTER UNLOAD
cBefor CON 50 E33 E34 AFTER ASSEMBLE
eBase E34 821687307 821773707 5 BW3 EQUIPMENT AND
PERSONNEL IN PLACE @ N+7
cDuring con 50 E34 World
cAfter CON 50 E34 E33 AFTER ASSEMBLE
eBase E35 821687327 821773727 5 AIRCRAFT RETURN TRANSIT TO
US, 1 DAY
cDuring con 50 E35 World
cAfter CON 5 E35 E32 AFTER UNLOAD

Genetic Algorithm Output

cBefor CON 5 E35 E36 AFTER TRANSIT
eBase E36 821687325 821773725 5 AIRCRAFT AVAILABLE, N+5
cDuring con 50 E36 World
cAfter CON 5 E36 E35 AFTER TRANSIT
CR E36 C5 100 -40 40 C-5 RETURNED TO THE POOL
CR E36 PAX 100 -17 17 PAX PLANES RETURNED TO THE POOL
eBase E40 821687320 821773720 5 LOAD FIGHTER WIND #3, 1 DAY,
GULF COAST, N+2
cDuring con 50 E40 World
cAfter CON 50 E40 E23 AFTER MOBILIZATION
CR E40 C5 100 40 USE 40 C-5'S
CR E40 EQUIPGULF 100 4000 TO MOVE FW3'S 4.0K TONS OF EQUIPMENT
CR E40 PAX 100 17 USE 17 PAX PLANES
CR E40 PAXGULF 100 3300 TO MOVE FW3'S 3300 PERSONNEL
cBefor CON 50 E40 E41 AFTER LOAD
eBase E41 821687307 821773707 5 TRANSIT TIME TO KOREA, 1 DAY
cDuring con 50 E41 World
cAfter CON 50 E41 E40 AFTER LOAD
cBefor CON 50 E41 E42 AFTER TRANSIT
eBase E42 821687316 821773716 5 UNLOAD FW3, 1 DAY, N+4
cDuring con 50 E42 World
cAfter CON 50 E42 E41 AFTER TRANSIT
cBefor CON 50 E42 E43 AFTER UNLOAD
cBefor CON 5 E42 E45 AFTER UNLOAD
eBase E43 821687301 821946501 5 ASSEMBLE UNIT, 3 DAYS
cDuring con 50 E43 World
cAfter CON 50 E43 E42 AFTER UNLOAD
cBefor CON 50 E43 E44 AFTER ASSEMBLE
eBase E44 821687325 821773725 5 FW3 EQUIPMENT AND
PERSONNEL IN PLACE @ N+7
cDuring con 50 E44 World
cAfter CON 50 E44 E43 AFTER ASSEMBLE
eBase E45 821687318 821773718 5 AIRCRAFT RETURN TRANSIT TO
US, 1 DAY
cDuring con 50 E45 World
cAfter CON 5 E45 E42 AFTER UNLOAD
cBefor CON 5 E45 E46 AFTER TRANSIT
eBase E46 821687300 821773700 5 AIRCRAFT AVAILABLE, N+5
cDuring con 50 E46 World
cAfter CON 5 E46 E45 AFTER TRANSIT
CR E46 C5 100 -40 40 C-5 RETURNED TO THE POOL
CR E46 PAX 100 -17 17 PAX PLANES RETURNED TO THE POOL
eBase E50 821687298 821773698 5 LOAD BOMBER WING #2, 1 DAY,
EAST COAST, N+2
cDuring con 50 E50 World

Genetic Algorithm Output

cAfter CON 50 E50 E20 AFTER MOBILIZATION
CR E50 C5 100 20 USE 20 C-5'S AND
CR E50 C141 100 45 USE 45 C-141'S
CR E50 EQUIPEAST 100 4000 TO MOVE BW2'S 4.0K TONS OF EQUIPMENT
CR E50 PAX 100 17 USE 17 PAX PLANES
CR E50 PAXEAST 100 3300 TO MOVE BW2'S 3300 PERSONNEL
cBefor CON 50 E50 E51 AFTER LOAD
eBase E51 821687308 821773708 5 TRANSIT TIME TO KOREA, 1 DAY
cDuring con 50 E51 World
cAfter CON 50 E51 E50 AFTER LOAD
cBefor CON 50 E51 E52 AFTER TRANSIT
eBase E52 821687304 821773704 5 UNLOAD BW2, 1 DAY, N+4
cDuring con 50 E52 World
cAfter CON 50 E52 E51 AFTER TRANSIT
cBefor CON 50 E52 E53 AFTER UNLOAD
cBefor CON 5 E52 E55 AFTER UNLOAD
eBase E53 821687296 821946496 5 ASSEMBLE UNIT, 3 DAYS
cDuring con 50 E53 World
cAfter CON 50 E53 E52 AFTER UNLOAD
cBefor CON 50 E53 E54 AFTER ASSEMBLE
eBase E54 821687296 821773696 5 BW2'S EQUIPMENT AND
PERSONNEL IN PLACE @ N+7
cDuring con 50 E54 World
cAfter CON 50 E54 E53 AFTER ASSEMBLE
eBase E55 821687306 821773706 5 AIRCRAFT RETURN TRANSIT TO
US, 1 DAY
cDuring con 50 E55 World
cAfter CON 5 E55 E52 AFTER UNLOAD
cBefor CON 5 E55 E56 AFTER TRANSIT
eBase E56 821687304 821773704 5 AIRCRAFT AVAILABLE, N+5
cDuring con 50 E56 World
cAfter CON 5 E56 E55 AFTER TRANSIT
CR E56 C5 100 -20 20 C-5 RETURNED TO THE POOL
CR E56 C141 100 -45 45 C-141 RETURNED TO THE POOL
CR E56 PAX 100 -17 17 PAX PLANES RETURNED TO THE POOL
eBase E60 821687309 822032909 5 WAIT FOR AIRCRAFT
AVAILABILITY, 4 DAYS
cDuring con 50 E60 World
cAfter CON 50 E60 E22 AFTER MOBILIZATION
cBefor CON 50 E60 E61 AFTER WAIT
eBase E61 821687326 821773726 5 LOAD FIGHTER WIND #2, 1 DAY,
WEST COAST, N+6
cDuring con 50 E61 World
cAfter CON 50 E61 E60 AFTER WAIT
CR E61 C141 100 89 USE 89 C-141'S

Genetic Algorithm Output

CR E61 EQUIPWEST 100 4000 TO MOVE FW2'S 4.0K TONS OF EQUIPMENT
 CR E61 PAX 100 17 USE 17 PAX PLANES
 CR E61 PAXWEST 100 3300 TO MOVE FW2'S 3300 PERSONNEL
 cBefor CON 50 E61 E62 AFTER LOAD
 eBase E62 821687307 821773707 5 TRANSIT TIME TO KOREA, 1 DAY
 cDuring con 50 E62 World
 cAfter CON 50 E62 E61 AFTER LOAD
 cBefor CON 50 E62 E63 AFTER TRANSIT
 eBase E63 821687312 821773712 5 UNLOAD FW2, 1 DAY, N+8
 cDuring con 50 E63 World
 cAfter CON 50 E63 E62 AFTER TRANSIT
 cBefor CON 50 E63 E64 AFTER UNLOAD
 eBase E64 821687303 821946503 5 ASSEMBLE UNIT, 3 DAYS
 cDuring con 50 E64 World
 cAfter CON 50 E64 E63 AFTER UNLOAD
 cBefor CON 50 E64 E65 AFTER ASSEMBLE
 eBase E65 821687317 821773717 5 FW2 EQUIPMENT AND
 PERSONNEL IN PLACE @ N+11
 cDuring con 50 E65 World
 cAfter CON 50 E65 E64 AFTER ASSEMBLE
 cBefor CON 5 E65 E66 AFTER UNLOAD
 eBase E66 821687312 821773712 5 AIRCRAFT RETURN TRANSIT TO
 US, 1 DAY
 cDuring con 50 E66 World
 cAfter CON 5 E66 E65 AFTER UNLOAD
 cBefor CON 5 E66 E67 AFTER TRANSIT
 eBase E67 821687301 821773701 5 AIRCRAFT AVAILABLE, N+9
 cDuring con 50 E67 World
 cAfter CON 5 E67 E66 AFTER TRANSIT
 CR E67 C141 100 -89 89 C-141 RETURNED TO THE POOL
 CR E67 PAX 100 -17 17 PAX PLANES RETURNED TO THE POOL
 eBase E120 821687312 821946512 5 LOAD TANKERS, 3 DAYS
 cDuring con 50 E120 World
 cAfter CON 50 E120 E16 AFTER TANKERS ARE AVAIL @ N+10
 CR E120 TANKER 100 10 SEND ALL 10 TANKERS = 275K GAL POL
 cBefor CON 50 E120 E121 AFTER LOADING
 eBase E121 821687301 822637701 5 IN TRANSIT, 11 DAYS, TO KOREA
 FROM WEST COAST
 cDuring con 50 E121 World
 cAfter CON 50 E121 E120 AFTER LOADING
 cBefor CON 50 E121 E122 AFTER TRANSIT
 eBase E122 821687316 821946516 5 UNLOAD TANKERS, 3 DAYS
 cDuring con 50 E122 World
 cAfter CON 50 E122 E121 AFTER TRANSIT
 cBefor CON 50 E122 E123 AFTER UNLOADING

Genetic Algorithm Output

cBefor CON 50 E122 E124 AFTER UNLOADING
eBase E123 821687299 821773699 5 TANKER'S CARGO AVAIL DAY
N+27
cDuring con 50 E123 World
cAfter CON 50 E123 E122 AFTER UNLOADING
CR E123 POL 100 -275000 27.5K GALS/TANKER ADDED TO SUPPLY IN
KOREA
eBase E124 821687316 822637716 5 RETURN TRIP FOR TANKER, 11
DAYS
cDuring con 50 E124 World
cAfter CON 50 E124 E122 AFTER UNLOADING
cBefor CON 50 E124 E125 AFTER TRANSIT
eBase E125 821687302 821773702 5 TANKER AVAIL
cDuring con 50 E125 World
cAfter CON 50 E125 E124 AFTER TRANSIT
CR E125 TANKER 100 -10 RETURN 10 TANKERS TO POOL DAY N+38
cBefor CON 50 E125 E126 1ST 10 HAVE RETURN + 38 MORE SHOULD BE
AVAIL
eBase E126 821687308 821946508 5 LOAD TANKERS FOR NEXT TRIP
3 DAYS
cDuring con 50 E126 World
cAfter CON 50 E126 E125 1ST 10 HAVE RETURN + 38 MORE SHOULD BE
AVAIL
CR E126 TANKER 100 58 SEND ALL 58 TANKERS = 1595K GAL POL
cBefor CON 50 E126 E127 AFTER LOADING
eBase E127 821687303 822637703 5 IN TRANSIT, 11 DAYS, TO KOREA
FROM WEST COAST
cDuring con 50 E127 World
cAfter CON 50 E127 E126 AFTER LOADING
cBefor CON 50 E127 E128 AFTER TRANSIT
eBase E128 821687319 821946519 5 UNLOAD TANKERS, 3 DAYS
cDuring con 50 E128 World
cAfter CON 50 E128 E127 AFTER TRANSIT
cBefor CON 50 E128 E129 AFTER UNLOADING
cBefor CON 50 E128 E130 AFTER UNLOADING
eBase E129 821687312 821773712 5 TANKER'S CARGO AVAIL DAY
N+55
cDuring con 50 E129 World
cAfter CON 50 E129 E128 AFTER UNLOADING
CR E129 POL 100 -1.595e+006 27.5K GALS/TANKER ADDED TO SUPPLY IN
KOREA
eBase E130 821687305 822637705 5 RETURN TRIP FOR TANKER, 11
DAYS
cDuring con 50 E130 World
cAfter CON 50 E130 E128 AFTER UNLOADING

Genetic Algorithm Output

cBefor CON 50 E130 E131 AFTER RETURN TRANSIT
eBase E131 821687312 821773712 5 TANKERS AVAIL TO RELOAD
cDuring con 50 E131 World
cAfter CON 50 E131 E130 AFTER RETURN TRANSIT
CR E131 TANKER 100 -58 RETURN 58 TANKERS TO POOL DAY N+66
eBase E150 821687306 821946506 5 LOAD FAST SEALIFT, 3 DAYS
cDuring con 50 E150 World
cAfter CON 50 E150 E9 AFTER FAST SEALIFTS ARE AVAIL @ N+5
CR E150 RRFFAST 100 10 SEND ALL 10 FAST SEALIFTS = 203K TONS
CARGO
cBefor CON 50 E150 E151 AFTER LOADING
eBase E151 821687299 822292099 5 IN TRANSIT, 7 DAYS, TO KOREA
FROM WEST COAST
cDuring con 50 E151 World
cAfter CON 50 E151 E150 AFTER LOADING
cBefor CON 50 E151 E152 AFTER TRANSIT
eBase E152 821687317 821946517 5 UNLOAD FAST SEALIFTS, 3 DAYS
cDuring con 50 E152 World
cAfter CON 50 E152 E151 AFTER TRANSIT
cBefor CON 50 E152 E153 AFTER UNLOADING
cBefor CON 50 E152 E154 AFTER UNLOADING
eBase E153 821687314 821773714 5 FAST SEALIFT'S CARGO AVAIL
DAY N+18
cDuring con 50 E153 World
cAfter CON 50 E153 E152 AFTER UNLOADING
CR E153 AMMO 100 -121800 121.8K TONS AMMO (60% OF CARGO)
CR E153 OTHER 100 -81200 81.2K TONS OTHER (40% OF CARGO)
eBase E154 821687310 822292110 5 RETURN TRIP, 7 DAYS
cDuring con 50 E154 World
cAfter CON 50 E154 E152 AFTER UNLOADING
cBefor CON 50 E154 E155 AFTER TRANSIT
eBase E155 821687298 821773698 5 FAST SEALIFTS AVAIL TO
RELOAD
cDuring con 50 E155 World
cAfter CON 50 E155 E154 AFTER TRANSIT
CR E155 RRFFAST 100 -10 RETURN 10 FAST SEALIFTS TO POOL DAY
N+25
cBefor CON 50 E155 E156 AFTER FAST SEALIFTS ARE AVAIL @ N+25
eBase E156 821687300 821946500 5 LOAD FAST SEALIFT FOR NEXT
TRIP, 3 DAYS
cDuring con 50 E156 World
cAfter CON 50 E156 E155 AFTER FAST SEALIFTS ARE AVAIL @ N+25
CR E156 RRFFAST 100 10 SEND ALL 10 FAST SEALIFTS = 203K TONS
CARGO
cBefor CON 50 E156 E157 AFTER LOADING

Genetic Algorithm Output

eBase E157 821687306 822292106 5 IN TRANSIT, 7 DAYS, TO KOREA
 FROM WEST COAST
 cDuring con 50 E157 World
 cAfter CON 50 E157 E156 AFTER LOADING
 cBefor CON 50 E157 E158 AFTER TRANSIT
 eBase E158 821687310 821946510 5 UNLOAD FAST SEALIFTS, 3 DAYS
 cDuring con 50 E158 World
 cAfter CON 50 E158 E157 AFTER TRANSIT
 cBefor CON 50 E158 E159 AFTER UNLOADING
 cBefor CON 50 E158 E160 AFTER UNLOADING
 eBase E159 821687297 821773697 5 FAST SEALIFT'S 2ND CARGO
 AVAIL DAY N+38
 cDuring con 50 E159 World
 cAfter CON 50 E159 E158 AFTER UNLOADING
 CR E159 AMMO 100 -121800 121.8K TONS AMMO (60% OF CARGO)
 CR E159 OTHER 100 -81200 81.2K TONS OTHER (40% OF CARGO)
 eBase E160 821687315 822292115 5 RETURN TRIP, 7 DAYS
 cDuring con 50 E160 World
 cAfter CON 50 E160 E158 AFTER UNLOADING
 cBefor CON 50 E160 E161 AFTER TRANSIT
 eBase E161 821687315 821773715 5 FAST SEALIFTS AVAIL TO
 RELOAD
 cDuring con 50 E161 World
 cAfter CON 50 E161 E160 AFTER TRANSIT
 CR E161 RRFFAST 100 -10 RETURN 10 FAST SEALIFTS TO POOL DAY
 N+45
 eBase E180 821687326 821946526 5 LOAD RO-ROS, 3 DAYS
 cDuring con 50 E180 World
 cAfter CON 50 E180 E11 AFTER RO-ROS ARE AVAIL @ N+10
 CR E180 RORO 100 13 SEND ALL 13 RO-ROS = 198.9K TONS CARGO
 cBefor CON 50 E180 E181 AFTER LOADING
 eBase E181 821687305 822637705 5 IN TRANSIT, 11 DAYS, TO KOREA
 FROM WEST COAST
 cDuring con 50 E181 World
 cAfter CON 50 E181 E180 AFTER LOADING
 cBefor CON 50 E181 E182 AFTER TRANSIT
 eBase E182 821687322 821946522 5 UNLOAD RO-ROS, 3 DAYS
 cDuring con 50 E182 World
 cAfter CON 50 E182 E181 AFTER TRANSIT
 cBefor CON 50 E182 E183 AFTER UNLOADING
 cBefor CON 50 E182 E184 AFTER UNLOADING
 eBase E183 821687302 821773702 5 RO-RO'S CARGO AVAIL DAY
 N+27
 cDuring con 50 E183 World
 cAfter CON 50 E183 E182 AFTER UNLOADING

Genetic Algorithm Output

CR E183 AMMO 100 -119300 119.3K TONS AMMO (60% OF CARGO)
CR E183 OTHER 100 -79600 79.6K TONS OTHER (40% OF CARGO)
eBase E184 821687301 822637701 5 RETURN TRIP, 11 DAYS
cDuring con 50 E184 World
cAfter CON 50 E184 E182 AFTER UNLOADING
cBefor CON 50 E184 E185 AFTER TRANSIT
eBase E185 821687323 821773723 5 RO-ROS AVAIL TO RELOAD
cDuring con 50 E185 World
cAfter CON 50 E185 E184 AFTER TRANSIT
CR E185 RORO 100 -13 RETURN 13 RO-ROS TO POOL DAY N+38
cBefor CON 50 E185 E186 1ST 13 HAVE RETURN + 8 MORE SHOULD BE AVAIL
eBase E186 821687315 821946515 5 LOAD RO-ROS FOR NEXT TRIP, 3
DAYS
cDuring con 50 E186 World
cAfter CON 50 E186 E185 1ST 13 HAVE RETURN + 8 MORE SHOULD BE AVAIL
CR E186 RORO 100 21 SEND ALL 21 RO-ROS = 321.3K TONS CARGO
cBefor CON 50 E186 E187 AFTER LOADING
eBase E187 821687322 822637722 5 IN TRANSIT, 11 DAYS, TO KOREA
FROM WEST COAST
cDuring con 50 E187 World
cAfter CON 50 E187 E186 AFTER LOADING
cBefor CON 50 E187 E188 AFTER TRANSIT
eBase E188 821687305 821946505 5 UNLOAD RO-ROS, 3 DAYS
cDuring con 50 E188 World
cAfter CON 50 E188 E187 AFTER TRANSIT
cBefor CON 50 E188 E189 AFTER UNLOADING
cBefor CON 50 E188 E190 AFTER UNLOADING
eBase E189 821687314 821773714 5 RO-RO'S 2ND CARGO AVAIL DAY
N+55
cDuring con 50 E189 World
cAfter CON 50 E189 E188 AFTER UNLOADING
CR E189 AMMO 100 -192800 192.8K TONS AMMO (60% OF CARGO)
CR E189 OTHER 100 -128500 128.5K TONS OTHER (40% OF CARGO)
eBase E190 821687298 822637698 5 RETURN TRIP, 11 DAYS
cDuring con 50 E190 World
cAfter CON 50 E190 E188 AFTER UNLOADING
cBefor CON 50 E190 E191 AFTER TRANSIT
eBase E191 821687297 821773697 5 RO-ROS AVAIL TO RELOAD
cDuring con 50 E191 World
cAfter CON 50 E191 E190 AFTER TRANSIT
CR E191 RORO 100 -21 RETURN 21 RO-ROS TO POOL DAY N+45
eBase E210 821687316 821946516 5 LOAD DRY CARGO SHIPS, 3
DAYS
cDuring con 50 E210 World
cAfter CON 50 E210 E15 AFTER DRY CARGO SHIPS ARE AVAIL @ N+30

Genetic Algorithm Output

CR E210 DRYCARGO 100 30 SEND 30 DRY CARGO = 630K TONS CARGO
cBefor CON 50 E210 E211 AFTER LOADING
eBase E211 821687308 822637708 5 IN TRANSIT, 11 DAYS, TO KOREA
FROM WEST COAST
cDuring con 50 E211 World
cAfter CON 50 E211 E210 AFTER LOADING
cBefor CON 50 E211 E212 AFTER TRANSIT
eBase E212 821687298 821946498 5 UNLOAD DRY CARGO SHIPS, 3
DAYS
cDuring con 50 E212 World
cAfter CON 50 E212 E211 AFTER TRANSIT
cBefor CON 50 E212 E213 AFTER UNLOADING
cBefor CON 50 E212 E214 AFTER UNLOADING
eBase E213 821687302 821773702 5 DRY CARGO SHIP'S CARGO
AVAIL DAY N+47
cDuring con 50 E213 World
cAfter CON 50 E213 E212 AFTER UNLOADING
CR E213 AMMO 100 -378000 378K TONS AMMO (60% OF CARGO)
CR E213 OTHER 100 -252000 252K TONS OTHER (40% OF CARGO)
eBase E214 821687296 822637696 5 RETURN TRIP, 11 DAYS
cDuring con 50 E214 World
cAfter CON 50 E214 E212 AFTER UNLOADING
cBefor CON 50 E214 E215 AFTER TRANSIT
eBase E215 821687308 821773708 5 DRY CARGO SHIPS AVAIL TO
RELOAD
cDuring con 50 E215 World
cAfter CON 50 E215 E214 AFTER TRANSIT
CR E215 DRYCARGO 100 -30 RETURN 30 DRY CARGO SHIPS TO POOL
DAY N+58
cBefor CON 50 E215 E216 AVAIL AFTER N+58
eBase E216 821687301 821946501 5 LOAD DRY CARGO SHIPS FOR
NEXT TRIP, 3 DAYS
cDuring con 50 E216 World
cAfter CON 50 E216 E215 AVAIL AFTER N+58
CR E216 DRYCARGO 100 30 SEND 30 DRY CARGO = 630K TONS CARGO
cBefor CON 50 E216 E217 AFTER LOADING
eBase E217 821687321 822637721 5 IN TRANSIT, 11 DAYS, TO KOREA
FROM WEST COAST
cDuring con 50 E217 World
cAfter CON 50 E217 E216 AFTER LOADING
cBefor CON 50 E217 E218 AFTER TRANSIT
eBase E218 821687325 821946525 5 UNLOAD DRY CARGO SHIPS, 3
DAYS
cDuring con 50 E218 World
cAfter CON 50 E218 E217 AFTER TRANSIT

Genetic Algorithm Output

cBefor CON 50 E218 E219 AFTER UNLOADING
cBefor CON 50 E218 E220 AFTER UNLOADING
eBase E219 821687321 821773721 5 DRY CARGO SHIP'S 2ND CARGO
AVAIL DAY N+75
cDuring con 50 E219 World
cAfter CON 50 E219 E218 AFTER UNLOADING
CR E219 AMMO 100 -378000 378K TONS AMMO (60% OF CARGO)
CR E219 OTHER 100 -252000 252K TONS OTHER (40% OF CARGO)
eBase E220 821687314 822637714 5 RETURN TRIP, 11 DAYS
cDuring con 50 E220 World
cAfter CON 50 E220 E218 AFTER UNLOADING
cBefor CON 50 E220 E221 AFTER TRANSIT
eBase E221 821687297 821773697 5 DRY CARGO SHIPS AVAIL TO
RELOAD
cDuring con 50 E221 World
cAfter CON 50 E221 E220 AFTER TRANSIT
CR E221 DRYCARGO 100 -30 RETURN 30 DRY CARGO SHIP TO POOL DAY
N+86
eBase E240 821687324 822119324 5 LOAD RRF CARGO SHIPS, 5
DAYS
cDuring con 50 E240 World
cAfter CON 50 E240 E10 AFTER RRF CARGO SHIPS ARE AVAIL @ N+10
CR E240 RRFCARGO 100 45 SEND 45 RRF CARGO = 504K TONS CARGO
cBefor CON 50 E240 E241 AFTER LOADING
eBase E241 821687300 822724100 5 IN TRANSIT, 12 DAYS, TO KOREA
FROM WEST COAST
cDuring con 50 E241 World
cAfter CON 50 E241 E240 AFTER LOADING
cBefor CON 50 E241 E242 AFTER TRANSIT
eBase E242 821687300 822119300 5 UNLOAD RRF CARGO SHIPS, 5
DAYS
cDuring con 50 E242 World
cAfter CON 50 E242 E241 AFTER TRANSIT
cBefor CON 50 E242 E243 AFTER UNLOADING
cBefor CON 50 E242 E244 AFTER UNLOADING
eBase E243 821687298 821773698 5 RRF CARGO SHIP'S CARGO
AVAIL DAY N+32
cDuring con 50 E243 World
cAfter CON 50 E243 E242 AFTER UNLOADING
CR E243 AMMO 100 -302400 302.4K TONS AMMO (60% OF CARGO)
CR E243 OTHER 100 -201600 201.6K TONS OTHER (40% OF CARGO)
eBase E244 821687296 822724096 5 RETURN TRIP, 12 DAYS
cDuring con 50 E244 World
cAfter CON 50 E244 E242 AFTER UNLOADING
cBefor CON 50 E244 E245 AFTER TRANSIT

Genetic Algorithm Output

eBase E245 821687298 821773698 5 RRF CARGO SHIPS AVAIL TO
RELOAD
cDuring con 50 E245 World
cAfter CON 50 E245 E244 AFTER TRANSIT
CR E245 RRFCARGO 100 -45 RETURN 45 RRF CARGO SHIPS TO POOL DAY
N+44
cBefor CON 50 E245 E246 AVAIL AFTER N+44
eBase E246 821687311 822119311 5 LOAD RRF CARGO SHIPS FOR
NEXT TRIP, 5 DAYS
cDuring con 50 E246 World
cAfter CON 50 E246 E245 AVAIL AFTER N+44
CR E246 RRFCARGO 100 45 SEND 45 RRF CARGO = 504K TONS CARGO
cBefor CON 50 E246 E247 AFTER LOADING
eBase E247 821687318 822724118 5 IN TRANSIT, 12 DAYS, TO KOREA
FROM WEST COAST
cDuring con 50 E247 World
cAfter CON 50 E247 E246 AFTER LOADING
cBefor CON 50 E247 E248 AFTER TRANSIT
eBase E248 821687309 822119309 5 UNLOAD RRF CARGO SHIPS, 5
DAYS
cDuring con 50 E248 World
cAfter CON 50 E248 E247 AFTER TRANSIT
cBefor CON 50 E248 E249 AFTER UNLOADING
cBefor CON 50 E248 E250 AFTER UNLOADING
eBase E249 821687323 821773723 5 RRF CARGO SHIP'S 2ND CARGO
AVAIL DAY N+66
cDuring con 50 E249 World
cAfter CON 50 E249 E248 AFTER UNLOADING
CR E249 AMMO 100 -302400 302.4K TONS AMMO (60% OF CARGO)
CR E249 OTHER 100 -201600 201.6K TONS OTHER (40% OF CARGO)
eBase E250 821687314 822724114 5 RETURN TRIP, 12 DAYS
cDuring con 50 E250 World
cAfter CON 50 E250 E248 AFTER UNLOADING
cBefor CON 50 E250 E251 AFTER TRANSIT
eBase E251 821687297 821773697 5 RRF CARGO SHIPS AVAIL TO
RELOAD
cDuring con 50 E251 World
cAfter CON 50 E251 E250 AFTER TRANSIT
CR E251 RRFCARGO 100 -45 RETURN 45 RRF CARGO SHIP TO POOL DAY
N+86

Appendix D-1

Input File For Scheduling City of Rockville Baseball Games.

RB C 10 CG College Gardens field
RB S 10 DS David Scull
RB D 10 DW Dogwood
RB L 10 LO Lone Oak
RB M 10 MO Monument
RB P 10 PWL Potomac Woods Lower
RB W 10 WGL Woodly Gardens Lower
eb ew 829614600 833698800 10 All events occur within this world event
eb e1G3 829614600 829623600 10
cd con 50 e1G3 ew
CR e1G3 C 100 1
eb e2G6 829614600 829623600 10
cd con 50 e2G6 ew
CR e2G6 S 100 1
eb e4G20 829614600 829623600 10
cd con 50 e4G20 ew
CR e4G20 M 100 1
eb e5G9 829614600 829623600 10
cd con 50 e5G9 ew
CR e5G9 P 100 1
eb e7G11 829614600 829623600 10
cd con 50 e7G11 ew
CR e7G11 D 100 1
eb e8G22 829623600 829632600 10
cd con 50 e8G22 ew
CR e8G22 D 100 1
eb e10G12 829787400 829796400 10
cd con 50 e10G12 ew
CR e10G12 C 100 1
eb e13G19 829787400 829796400 10
cd con 50 e13G19 ew
CR e13G19 S 100 1
eb e14G16 829787400 829796400 10
cd con 50 e14G16 ew
CR e14G16 M 100 1
eb e15G17 829787400 829796400 10
cd con 50 e15G17 ew
CR e15G17 P 100 1
eb e18G24 829787400 829796400 10
cd con 50 e18G24 ew
CR e18G24 D 100 1
eb e21G23 829796400 829805400 10

cd con 50 e21G23 ew
CR e21G23 D 100 1

eb e1G5 830019600 830028600 10
cd con 50 e1G5 ew
CR e1G5 P 100 1
eb e2G12 830019600 830028600 10
cd con 50 e2G12 ew
CR e2G12 D 100 1
eb e3G23 830028600 830037600 10
cd con 50 e3G23 ew
CR e3G23 P 100 1
eb e4G16 830028600 830037600 10
cd con 50 e4G16 ew
CR e4G16 D 100 1
eb e6G22 830037600 830046600 10
cd con 50 e6G22 ew
CR e6G22 L 100 1
eb e7G15 830037600 830046600 10
cd con 50 e7G15 ew
CR e7G15 P 100 1
eb e8G18 830039400 830048400 10
cd con 50 e8G18 ew
CR e8G18 D 100 1
eb e9G11 830046600 830055600 10
cd con 50 e9G11 ew
CR e9G11 S 100 1
eb e10G24 830046600 830055600 10
cd con 50 e10G24 ew
CR e10G24 C 100 1
eb e13G17 830046600 830055600 10
cd con 50 e13G17 ew
CR e13G17 P 100 1
eb e14G20 830046600 830055600 10
cd con 50 e14G20 ew
CR e14G20 D 100 1
eb e19G21 830055600 830064600 10
cd con 50 e19G21 ew
CR e19G21 D 100 1

eb e1G23 830219400 830228400 10
cd con 50 e1G23 ew
CR e1G23 C 100 1

eb e2G10 830219400 830228400 10
 cd con 50 e2G10 ew
 CR e2G10 S 100 1
 eb e3G21 830219400 830228400 10
 cd con 50 e3G21 ew
 CR e3G21 M 100 1
 eb e4G12 830219400 830228400 10
 cd con 50 e4G12 ew
 CR e4G12 P 100 1
 eb e5G7 830219400 830228400 10
 cd con 50 e5G7 ew
 CR e5G7 D 100 1
 eb e6G24 830228400 830237400 10
 cd con 50 e6G24 ew
 CR e6G24 D 100 1
 eb e8G14 830392200 830401200 10
 cd con 50 e8G14 ew
 CR e8G14 C 100 1
 eb e9G13 830392200 830401200 10
 cd con 50 e9G13 ew
 CR e9G13 S 100 1
 eb e11G15 830392200 830401200 10
 cd con 50 e11G15 ew
 CR e11G15 M 100 1
 eb e16G18 830392200 830401200 10
 cd con 50 e16G18 ew
 CR e16G18 P 100 1
 eb e17G19 830392200 830401200 10
 cd con 50 e17G19 ew
 CR e17G19 D 100 1
 eb e20G22 830401200 830410200 10
 cd con 50 e20G22 ew
 CR e20G22 D 100 1

eb e1G13 830624400 830633400 10
 cd con 50 e1G13 ew
 CR e1G13 S 100 1
 eb e2G4 830624400 830633400 10
 cd con 50 e2G4 ew
 CR e2G4 M 100 1
 eb e3G15 830624400 830633400 10
 cd con 50 e3G15 ew
 CR e3G15 P 100 1
 eb e5G23 830633400 830642400 10

cd con 50 e5G23 ew
 CR e5G23 M 100 1
 eb e6G14 830633400 830642400 10
 cd con 50 e6G14 ew
 CR e6G14 P 100 1
 eb e7G19 830633400 830642400 10
 cd con 50 e7G19 ew
 CR e7G19 S 100 1
 eb e8G16 830642400 830651400 10
 cd con 50 e8G16 ew
 CR e8G16 M 100 1
 eb e9G17 830642400 830651400 10
 cd con 50 e9G17 ew
 CR e9G17 P 100 1
 eb e10G18 830642400 830651400 10
 cd con 50 e10G18 ew
 CR e10G18 S 100 1
 eb e11G21 830651400 830660400 10
 cd con 50 e11G21 ew
 CR e11G21 S 100 1
 eb e12G20 830651400 830660400 10
 cd con 50 e12G20 ew
 CR e12G20 M 100 1
 eb e22G24 830651400 830660400 10
 cd con 50 e22G24 ew
 CR e22G24 P 100 1

eb e1G17 830824200 830833200 10
 cd con 50 e1G17 ew
 CR e1G17 C 100 1
 eb e2G8 830824200 830833200 10
 cd con 50 e2G8 ew
 CR e2G8 S 100 1
 eb e3G5 830824200 830833200 10
 cd con 50 e3G5 ew
 CR e3G5 M 100 1
 eb e4G10 830824200 830833200 10
 cd con 50 e4G10 ew
 CR e4G10 P 100 1
 eb e6G12 830824200 830833200 10
 cd con 50 e6G12 ew
 CR e6G12 D 100 1
 eb e7G21 830833200 830842200 10
 cd con 50 e7G21 ew

CR e7G21 D 100 1
 eb e9G19 830997000 831006000 10
 cd con 50 e9G19 ew
 CR e9G19 C 100 1
 eb e11G13 830997000 831006000 10
 cd con 50 e11G13 ew
 CR e11G13 S 100 1
 eb e14G24 830997000 831006000 10
 cd con 50 e14G24 ew
 CR e14G24 M 100 1
 eb e15G23 830997000 831006000 10
 cd con 50 e15G23 ew
 CR e15G23 P 100 1
 eb e16G20 830997000 831006000 10
 cd con 50 e16G20 ew
 CR e16G20 D 100 1
 eb e18G22 831006000 831015000 10
 cd con 50 e18G22 ew
 CR e18G22 D 100 1

eb e1G19 831229200 831238200 10
 cd con 50 e1G19 ew
 CR e1G19 P 100 1
 eb e2G22 831229200 831238200 10
 cd con 50 e2G22 ew
 CR e2G22 D 100 1
 eb e3G13 831238200 831247200 10
 cd con 50 e3G13 ew
 CR e3G13 P 100 1
 eb e4G24 831238200 831247200 10
 cd con 50 e4G24 ew
 CR e4G24 D 100 1
 eb e5G17 831247200 831256200 10
 cd con 50 e5G17 ew
 CR e5G17 L 100 1
 eb e6G8 831247200 831256200 10
 cd con 50 e6G8 ew
 CR e6G8 P 100 1
 eb e7G9 831249000 831258000 10
 cd con 50 e7G9 ew
 CR e7G9 D 100 1
 eb e10G14 831256200 831265200 10
 cd con 50 e10G14 ew
 CR e10G14 S 100 1

eb e11G23 831256200 831265200 10
 cd con 50 e11G23 ew
 CR e11G23 C 100 1
 eb e12G16 831256200 831265200 10
 cd con 50 e12G16 ew
 CR e12G16 P 100 1
 eb e15G21 831256200 831265200 10
 cd con 50 e15G21 ew
 CR e15G21 D 100 1
 eb e18G20 831265200 831274200 10
 cd con 50 e18G20 ew
 CR e18G20 D 100 1

eb e1G21 831429000 831438000 10
 cd con 50 e1G21 ew
 CR e1G21 C 100 1
 eb e2G18 831429000 831438000 10
 cd con 50 e2G18 ew
 CR e2G18 S 100 1
 eb e3G11 831429000 831438000 10
 cd con 50 e3G11 ew
 CR e3G11 M 100 1
 eb e4G22 831429000 831438000 10
 cd con 50 e4G22 ew
 CR e4G22 P 100 1
 eb e5G13 831429000 831438000 10
 cd con 50 e5G13 ew
 CR e5G13 D 100 1
 eb e6G10 831438000 831447000 10
 cd con 50 e6G10 ew
 CR e6G10 D 100 1
 eb e7G17 831601800 831610800 10
 cd con 50 e7G17 ew
 CR e7G17 C 100 1
 eb e8G20 831601800 831610800 10
 cd con 50 e8G20 ew
 CR e8G20 S 100 1
 eb e9G15 831601800 831610800 10
 cd con 50 e9G15 ew
 CR e9G15 M 100 1
 eb e12G14 831601800 831610800 10
 cd con 50 e12G14 ew
 CR e12G14 P 100 1
 eb e16G24 831601800 831610800 10

cd con 50 e16G24 ew
 CR e16G24 D 100 1
 eb e19G23 831610800 831619800 10
 cd con 50 e19G23 ew
 CR e19G23 D 100 1

eb e1G11 831834000 831843000 10
 cd con 50 e1G11 ew
 CR e1G11 S 100 1
 eb e2G24 831834000 831843000 10
 cd con 50 e2G24 ew
 CR e2G24 M 100 1
 eb e3G19 831834000 831843000 10
 cd con 50 e3G19 ew
 CR e3G19 P 100 1
 eb e4G14 831843000 831852000 10
 cd con 50 e4G14 ew
 CR e4G14 M 100 1
 eb e5G15 831843000 831852000 10
 cd con 50 e5G15 ew
 CR e5G15 P 100 1
 eb e6G20 831843000 831852000 10
 cd con 50 e6G20 ew
 CR e6G20 S 100 1
 eb e7G13 831852000 831861000 10
 cd con 50 e7G13 ew
 CR e7G13 M 100 1
 eb e8G10 831852000 831861000 10
 cd con 50 e8G10 ew
 CR e8G10 P 100 1
 eb e9G21 831852000 831861000 10
 cd con 50 e9G21 ew
 CR e9G21 S 100 1
 eb e12G18 831861000 831870000 10
 cd con 50 e12G18 ew
 CR e12G18 S 100 1
 eb e16G22 831861000 831870000 10
 cd con 50 e16G22 ew
 CR e16G22 M 100 1
 eb e17G23 831861000 831870000 10
 cd con 50 e17G23 ew
 CR e17G23 P 100 1

eb e1G9 832033800 832042800 10
 cd con 50 e1G9 ew
 CR e1G9 C 100 1
 eb e2G14 832033800 832042800 10
 cd con 50 e2G14 ew
 CR e2G14 S 100 1
 eb e3G7 832033800 832042800 10
 cd con 50 e3G7 ew
 CR e3G7 M 100 1
 eb e4G8 832033800 832042800 10
 cd con 50 e4G8 ew
 CR e4G8 P 100 1
 eb e5G21 832033800 832042800 10
 cd con 50 e5G21 ew
 CR e5G21 D 100 1
 eb e6G18 832042800 832051800 10
 cd con 50 e6G18 ew
 CR e6G18 D 100 1
 eb e10G16 832206600 832215600 10
 cd con 50 e10G16 ew
 CR e10G16 C 100 1
 eb e11G17 832206600 832215600 10
 cd con 50 e11G17 ew
 CR e11G17 S 100 1
 eb e12G22 832206600 832215600 10
 cd con 50 e12G22 ew
 CR e12G22 M 100 1
 eb e13G23 832206600 832215600 10
 cd con 50 e13G23 ew
 CR e13G23 P 100 1
 eb e15G19 832206600 832215600 10
 cd con 50 e15G19 ew
 CR e15G19 D 100 1
 eb e20G24 832215600 832224600 10
 cd con 50 e20G24 ew
 CR e20G24 D 100 1

eb e2G20 832438800 832447800 10
 cd con 50 e2G20 ew
 CR e2G20 P 100 1
 eb e3G9 832438800 832447800 10
 cd con 50 e3G9 ew
 CR e3G9 D 100 1
 eb e4G6 832447800 832456800 10

cd con 50 e4G6 ew
 CR e4G6 P 100 1
 eb e5G19 832447800 832456800 10
 cd con 50 e5G19 ew
 CR e5G19 D 100 1
 eb e7G23 832456800 832465800 10
 cd con 50 e7G23 ew
 CR e7G23 L 100 1
 eb e10G22 832456800 832465800 10
 cd con 50 e10G22 ew
 CR e10G22 P 100 1
 eb e12G24 832458600 832467600 10
 cd con 50 e12G24 ew
 CR e12G24 D 100 1
 eb e13G15 832465800 832474800 10
 cd con 50 e13G15 ew
 CR e13G15 S 100 1
 eb e14G18 832465800 832474800 10
 cd con 50 e14G18 ew
 CR e14G18 C 100 1
 eb e17G21 832465800 832474800 10
 cd con 50 e17G21 ew
 CR e17G21 P 100 1

eb e1G15 832638600 832647600 10
 cd con 50 e1G15 ew
 CR e1G15 C 100 1
 eb e3G17 832638600 832647600 10
 cd con 50 e3G17 ew
 CR e3G17 S 100 1
 eb e4G18 832638600 832647600 10
 cd con 50 e4G18 ew
 CR e4G18 M 100 1
 eb e6G16 832638600 832647600 10
 cd con 50 e6G16 ew
 CR e6G16 P 100 1
 eb e8G24 832638600 832647600 10
 cd con 50 e8G24 ew
 CR e8G24 D 100 1
 eb e9G23 832647600 832656600 10
 cd con 50 e9G23 ew
 CR e9G23 D 100 1
 eb e10G20 832811400 832820400 10
 cd con 50 e10G20 ew

CR e10G20 C 100 1
 eb e11G19 832811400 832820400 10
 cd con 50 e11G19 ew
 CR e11G19 S 100 1
 eb e13G21 832811400 832820400 10
 cd con 50 e13G21 ew
 CR e13G21 M 100 1
 eb e14G22 832811400 832820400 10
 cd con 50 e14G22 ew
 CR e14G22 P 100 1

eb e1G7 833043600 833052600 10
 cd con 50 e1G7 ew
 CR e1G7 S 100 1
 eb e2G16 833043600 833052600 10
 cd con 50 e2G16 ew
 CR e2G16 M 100 1
 eb e3G6 833043600 833052600 10
 cd con 50 e3G6 ew
 CR e3G6 P 100 1
 eb e4G23 833052600 833061600 10
 cd con 50 e4G23 ew
 CR e4G23 M 100 1
 eb e5G11 833052600 833061600 10
 cd con 50 e5G11 ew
 CR e5G11 P 100 1
 eb e8G12 833052600 833061600 10
 cd con 50 e8G12 ew
 CR e8G12 S 100 1
 eb e9G10 833061600 833070600 10
 cd con 50 e9G10 ew
 CR e9G10 M 100 1
 eb e13G14 833061600 833070600 10
 cd con 50 e13G14 ew
 CR e13G14 P 100 1
 eb e15G20 833061600 833070600 10
 cd con 50 e15G20 ew
 CR e15G20 S 100 1
 eb e17G18 833070600 833079600 10
 cd con 50 e17G18 ew
 CR e17G18 S 100 1
 eb e19G22 833070600 833079600 10
 cd con 50 e19G22 ew
 CR e19G22 M 100 1

eb e21G24 833070600 833079600 10
cd con 50 e21G24 ew
CR e21G24 P 100 1

eb e1G14 833243400 833252400 10
cd con 50 e1G14 ew
CR e1G14 C 100 1

eb e2G21 833243400 833252400 10
cd con 50 e2G21 ew
CR e2G21 S 100 1

eb e3G10 833243400 833252400 10
cd con 50 e3G10 ew
CR e3G10 M 100 1

eb e4G7 833243400 833252400 10
cd con 50 e4G7 ew
CR e4G7 P 100 1

eb e5G12 833243400 833252400 10
cd con 50 e5G12 ew
CR e5G12 D 100 1

eb e6G9 833252400 833261400 10
cd con 50 e6G9 ew
CR e6G9 D 100 1

eb e8G23 833416200 833425200 10
cd con 50 e8G23 ew
CR e8G23 C 100 1

eb e11G16 833416200 833425200 10
cd con 50 e11G16 ew
CR e11G16 S 100 1

eb e13G20 833416200 833425200 10
cd con 50 e13G20 ew
CR e13G20 M 100 1

eb e15G18 833416200 833425200 10
cd con 50 e15G18 ew
CR e15G18 P 100 1

eb e17G22 833416200 833425200 10
cd con 50 e17G22 ew
CR e17G22 D 100 1

eb e19G24 833425200 833434200 10
cd con 50 e19G24 ew
CR e19G24 D 100 1

eb e1G16 833648400 833657400 10
cd con 50 e1G16 ew

CR e1G16 P 100 1
 eb e2G17 833648400 833657400 10
 cd con 50 e2G17 ew
 CR e2G17 D 100 1
 eb e3G18 833657400 833666400 10
 cd con 50 e3G18 ew
 CR e3G18 P 100 1
 eb e4G19 833657400 833666400 10
 cd con 50 e4G19 ew
 CR e4G19 D 100 1
 eb e5G24 833666400 833675400 10
 cd con 50 e5G24 ew
 CR e5G24 L 100 1
 eb e6G23 833666400 833675400 10
 cd con 50 e6G23 ew
 CR e6G23 P 100 1
 eb e7G12 833668200 833677200 10
 cd con 50 e7G12 ew
 CR e7G12 D 100 1
 eb e8G13 833675400 833684400 10
 cd con 50 e8G13 ew
 CR e8G13 S 100 1
 eb e9G22 833675400 833684400 10
 cd con 50 e9G22 ew
 CR e9G22 C 100 1
 eb e10G11 833675400 833684400 10
 cd con 50 e10G11 ew
 CR e10G11 P 100 1
 eb e14G15 833675400 833684400 10
 cd con 50 e14G15 ew
 CR e14G15 D 100 1
 eb e20G21 833684400 833693400 10
 cd con 50 e20G21 ew
 CR e20G21 D 100 1

Appendix D-2

Output File for Scheduling City of Rockville Baseball Games.

The start date for the game schedule is Mon Apr 15 05:30:00 PM 1996

ROCKVILLE BASEBALL SCHEDULE

For 7 weeks with 12 teams in a league

The Field abbreviations are as follows

C means CG College Gardens field

S means DS David Scull

D means DW Dogwood

L means LO Lone Oak

M means MO Monument

P means PWL potomac Woods Lower

W means WGL Woodly Gardens Lower

TEAMS	Playing Field	Day & Time
1-3	C	Mon Apr 15 05:30:00 PM 1996
2-6	S	Mon Apr 15 05:30:00 PM 1996
4-20	M	Mon Apr 15 05:30:00 PM 1996
5-9	P	Mon Apr 15 05:30:00 PM 1996
7-11	D	Mon Apr 15 05:30:00 PM 1996
8-22	D	Mon Apr 15 08:00:00 PM 1996
10-12	C	Wed Apr 17 05:30:00 PM 1996
13-19	S	Wed Apr 17 05:30:00 PM 1996
14-16	M	Wed Apr 17 05:30:00 PM 1996
15-17	P	Wed Apr 17 05:30:00 PM 1996
18-24	D	Wed Apr 17 05:30:00 PM 1996
21-23	D	Wed Apr 17 08:00:00 PM 1996

1-5	P	Sat Apr 20 10:00:00 AM 1996
2-12	D	Sat Apr 20 10:00:00 AM 1996
3-23	P	Sat Apr 20 12:30:00 PM 1996
4-16	D	Sat Apr 20 12:30:00 PM 1996
6-22	L	Sat Apr 20 03:00:00 PM 1996
7-15	P	Sat Apr 20 03:00:00 PM 1996
8-18	D	Sat Apr 20 03:00:00 PM 1996
9-11	S	Sat Apr 20 05:30:00 PM 1996
10-24	C	Sat Apr 20 05:30:00 PM 1996
13-17	P	Sat Apr 20 05:30:00 PM 1996
14-20	D	Sat Apr 20 05:30:00 PM 1996
19-21	D	Sat Apr 20 08:00:00 PM 1996
1-23	C	Mon Apr 22 05:30:00 PM 1996
2-10	S	Mon Apr 22 05:30:00 PM 1996
3-21	M	Mon Apr 22 05:30:00 PM 1996
4-12	P	Mon Apr 22 05:30:00 PM 1996
5-7	D	Mon Apr 22 05:30:00 PM 1996
6-24	D	Mon Apr 22 08:00:00 PM 1996
8-14	C	Wed Apr 24 05:30:00 PM 1996
9-13	S	Wed Apr 24 05:30:00 PM 1996
11-15	M	Wed Apr 24 05:30:00 PM 1996

16-18	P	Wed Apr 24 05:30:00 PM 1996
17-19	D	Wed Apr 24 05:30:00 PM 1996
20-22	D	Wed Apr 24 08:00:00 PM 1996
1-13	S	Sat Apr 27 10:00:00 AM 1996
2-4	M	Sat Apr 27 10:00:00 AM 1996
3-15	P	Sat Apr 27 10:00:00 AM 1996
5-23	M	Sat Apr 27 12:30:00 PM 1996
6-14	P	Sat Apr 27 12:30:00 PM 1996
7-19	S	Sat Apr 27 12:30:00 PM 1996
8-16	M	Sat Apr 27 03:00:00 PM 1996
9-17	P	Sat Apr 27 03:00:00 PM 1996
10-18	S	Sat Apr 27 03:00:00 PM 1996
11-21	S	Sat Apr 27 05:30:00 PM 1996
12-20	M	Sat Apr 27 05:30:00 PM 1996
22-24	P	Sat Apr 27 05:30:00 PM 1996
1-17	C	Mon Apr 29 05:30:00 PM 1996
2-8	S	Mon Apr 29 05:30:00 PM 1996
3-5	M	Mon Apr 29 05:30:00 PM 1996
4-10	P	Mon Apr 29 05:30:00 PM 1996
6-12	D	Mon Apr 29 05:30:00 PM 1996
7-21	D	Mon Apr 29 08:00:00 PM 1996

9-19	C	Wed May 01 05:30:00 PM 1996
11-13	S	Wed May 01 05:30:00 PM 1996
14-24	M	Wed May 01 05:30:00 PM 1996
15-23	P	Wed May 01 05:30:00 PM 1996
16-20	D	Wed May 01 05:30:00 PM 1996
18-22	D	Wed May 01 08:00:00 PM 1996
1-19	P	Sat May 04 10:00:00 AM 1996
2-22	D	Sat May 04 10:00:00 AM 1996
3-13	P	Sat May 04 12:30:00 PM 1996
4-24	D	Sat May 04 12:30:00 PM 1996
5-17	L	Sat May 04 03:00:00 PM 1996
6-8	P	Sat May 04 03:00:00 PM 1996
7-9	D	Sat May 04 03:00:00 PM 1996
10-14	S	Sat May 04 05:30:00 PM 1996
11-23	C	Sat May 04 05:30:00 PM 1996
12-16	P	Sat May 04 05:30:00 PM 1996
15-21	D	Sat May 04 05:30:00 PM 1996
18-20	D	Sat May 04 08:00:00 PM 1996
1-21	C	Mon May 06 05:30:00 PM 1996
2-18	S	Mon May 06 05:30:00 PM 1996
3-11	M	Mon May 06 05:30:00 PM 1996

4-22	P	Mon May 06 05:30:00 PM 1996
5-13	D	Mon May 06 05:30:00 PM 1996
6-10	D	Mon May 06 08:00:00 PM 1996
7-17	C	Wed May 08 05:30:00 PM 1996
8-20	S	Wed May 08 05:30:00 PM 1996
9-15	M	Wed May 08 05:30:00 PM 1996
12-14	P	Wed May 08 05:30:00 PM 1996
16-24	D	Wed May 08 05:30:00 PM 1996
19-23	D	Wed May 08 08:00:00 PM 1996
1-11	S	Sat May 11 10:00:00 AM 1996
2-24	M	Sat May 11 10:00:00 AM 1996
3-19	P	Sat May 11 10:00:00 AM 1996
4-14	M	Sat May 11 12:30:00 PM 1996
5-15	P	Sat May 11 12:30:00 PM 1996
6-20	S	Sat May 11 12:30:00 PM 1996
7-13	M	Sat May 11 03:00:00 PM 1996
8-10	P	Sat May 11 03:00:00 PM 1996
9-21	S	Sat May 11 03:00:00 PM 1996
12-18	S	Sat May 11 05:30:00 PM 1996
16-22	M	Sat May 11 05:30:00 PM 1996
17-23	P	Sat May 11 05:30:00 PM 1996

1-9	C	Mon May 13 05:30:00 PM 1996
2-14	S	Mon May 13 05:30:00 PM 1996
3-7	M	Mon May 13 05:30:00 PM 1996
4-8	P	Mon May 13 05:30:00 PM 1996
5-21	D	Mon May 13 05:30:00 PM 1996
6-18	D	Mon May 13 08:00:00 PM 1996
10-16	C	Wed May 15 05:30:00 PM 1996
11-17	S	Wed May 15 05:30:00 PM 1996
12-22	M	Wed May 15 05:30:00 PM 1996
13-23	P	Wed May 15 05:30:00 PM 1996
15-19	D	Wed May 15 05:30:00 PM 1996
20-24	D	Wed May 15 08:00:00 PM 1996
2-20	P	Sat May 18 10:00:00 AM 1996
3-9	D	Sat May 18 10:00:00 AM 1996
4-6	P	Sat May 18 12:30:00 PM 1996
5-19	D	Sat May 18 12:30:00 PM 1996
7-23	L	Sat May 18 03:00:00 PM 1996
10-22	P	Sat May 18 03:00:00 PM 1996
12-24	D	Sat May 18 03:00:00 PM 1996
13-15	S	Sat May 18 05:30:00 PM 1996
14-18	C	Sat May 18 05:30:00 PM 1996
17-21	P	Sat May 18 05:30:00 PM 1996

1-15	C	Mon May 20 05:30:00 PM 1996
3-17	S	Mon May 20 05:30:00 PM 1996
4-18	M	Mon May 20 05:30:00 PM 1996
6-16	P	Mon May 20 05:30:00 PM 1996
8-24	D	Mon May 20 05:30:00 PM 1996
9-23	D	Mon May 20 08:00:00 PM 1996
10-20	C	Wed May 22 05:30:00 PM 1996
11-19	S	Wed May 22 05:30:00 PM 1996
13-21	M	Wed May 22 05:30:00 PM 1996
14-22	P	Wed May 22 05:30:00 PM 1996
1-7	S	Sat May 25 10:00:00 AM 1996
2-16	M	Sat May 25 10:00:00 AM 1996
3-6	P	Sat May 25 10:00:00 AM 1996
4-23	M	Sat May 25 12:30:00 PM 1996
5-11	P	Sat May 25 12:30:00 PM 1996
8-12	S	Sat May 25 12:30:00 PM 1996
9-10	M	Sat May 25 03:00:00 PM 1996
13-14	P	Sat May 25 03:00:00 PM 1996
15-20	S	Sat May 25 03:00:00 PM 1996
17-18	S	Sat May 25 05:30:00 PM 1996
19-22	M	Sat May 25 05:30:00 PM 1996

21-24	P	Sat May 25 05:30:00 PM 1996
1-14	C	Mon May 27 05:30:00 PM 1996
2-21	S	Mon May 27 05:30:00 PM 1996
3-10	M	Mon May 27 05:30:00 PM 1996
4-7	P	Mon May 27 05:30:00 PM 1996
5-12	D	Mon May 27 05:30:00 PM 1996
6-9	D	Mon May 27 08:00:00 PM 1996
8-23	C	Wed May 29 05:30:00 PM 1996
11-16	S	Wed May 29 05:30:00 PM 1996
13-20	M	Wed May 29 05:30:00 PM 1996
15-18	P	Wed May 29 05:30:00 PM 1996
17-22	D	Wed May 29 05:30:00 PM 1996
19-24	D	Wed May 29 08:00:00 PM 1996
1-16	P	Sat Jun 01 10:00:00 AM 1996
2-17	D	Sat Jun 01 10:00:00 AM 1996
3-18	P	Sat Jun 01 12:30:00 PM 1996
4-19	D	Sat Jun 01 12:30:00 PM 1996
5-24	L	Sat Jun 01 03:00:00 PM 1996
6-23	P	Sat Jun 01 03:00:00 PM 1996
7-12	D	Sat Jun 01 03:00:00 PM 1996
8-13	S	Sat Jun 01 05:30:00 PM 1996

9-22	C	Sat Jun 01 05:30:00 PM 1996
10-11	P	Sat Jun 01 05:30:00 PM 1996
14-15	D	Sat Jun 01 05:30:00 PM 1996
20-21	D	Sat Jun 01 08:00:00 PM 1996

Appendix D-3: Screen Shots of the GUESS Baseball Output

[illegible]

Appendix E-1

Input File for Scheduling University Department Courses

RB CS22-30 1 The class CS22 can have a max of 30 students

RB CS16-30 1

RB HUM109-30 1

RB SW111-30 1

RB HUM326-30 1

RB FACL-1 1

RB FACL-2 1

RB FACL-3 1

RB FACL-4 1

RB FACL-5 1

RB FACL-6 1

RB FACL-7 1

RB FACL-8 1

RB FACL-9 1

RB FACL-10 1

eb ew 841752000 842158800 10 All events should occur within this world event

eb CS110-1270-TR 841762800 841767300 10

cd con 50 CS110-1270-TR ew

CR CS110-1270-TR CS22-30 100 1

CR CS110-1270-TR FACL-1 100 1

eb CS110-1271-MWF 841856400 841859400 10

cd con 50 CS110-1271-MWF ew

CR CS110-1271-MWF CS22-30 100 1

CR CS110-1271-MWF FACL-2 100 1

eb CS111-1278-MWF 841860000 841863000 10

cd con 50 CS111-1278-MWF ew

CR CS111-1278-MWF CS16-30 100 1

CR CS111-1278-MWF FACL-3 100 1

eb CS111-1280-T 841800600 841810200 10

cd con 50 CS111-1280-T ew

CR CS111-1280-T HUM109-30 100 1

CR CS111-1280-T FACL-4 100 1

eb CS136-1281-TR 841768200 841772700 10

cd con 50 CS136-1281-TR ew
CR CS136-1281-TR CS22-30 100 1
CR CS136-1281-TR FACL-1 100 1

eb CS136-1282-MWF 841856400 841859400 10
cd con 50 CS136-1282-MWF ew
CR CS136-1282-MWF SW111-30 100 1
CR CS136-1282-MWF FACL-5 100 1

eb CS140-1284-MWF 841852800 841855800 10
cd con 50 CS140-1284-MWF ew
CR CS140-1284-MWF CS22-30 100 1
CR CS140-1284-MWF FACL-6 100 1

eb CS140-1285-TR 841768200 841772700 10
cd con 50 CS140-1285-TR ew
CR CS140-1285-TR CS16-30 100 1
CR CS140-1285-TR FACL-4 100 1

eb CS156-1292-MWF 841856400 841859400 10
cd con 50 CS156-1292-MWF ew
CR CS156-1292-MWF HUM326-30 100 1
CR CS156-1292-MWF FACL-7 100 1

eb CS156-1293-MWF 841860000 841863000 10
cd con 50 CS156-1293-MWF ew
CR CS156-1293-MWF HUM326-30 100 1
CR CS156-1293-MWF FACL-7 100 1

Appendix E-2

Output File for Scheduling University Department Courses.

Class Room resource

RB CS22-30 1 The class CS22 can have a max of 30 students

RB CS16-30 1

RB HUM109-30 1

RB SW111-30 1

RB HUM326-30 1

Faculty Resource

RB FACL-1 1

RB FACL-2 1

RB FACL-3 1

RB FACL-4 1

RB FACL-5 1

RB FACL-6 1

RB FACL-7 1

RB FACL-8 1

RB FACL-9 1

RB FACL-10 1

The class CS110-1270-TR starts on Tue Sep 03 08:00:00 1996

The duration is 75 minutes

Class room is CS22-30

Faculty is FACL-1

The class CS110-1271-MWF starts on Wed Sep 04 10:00:00 1996

The duration is 50 minutes

Class room is CS22-30

Faculty is FACL-2

The class CS111-1278-MWF starts on Wed Sep 04 11:00:00 1996

The duration is 50 minutes

Class room is CS16-30

Faculty is FACL-3

The class CS111-1280-T starts on Tue Sep 03 18:30:00 1996

The duration is 160 minutes

Class room is HUM109-30

Faculty is FACL-4

The class CS136-1281-TR starts on Tue Sep 03 09:30:00 1996
The duration is 75 minutes
Class room is CS22-30
Faculty is FACL-1

The class CS136-1282-MWF starts on Wed Sep 04 10:00:00 1996
The duration is 50 minutes
Class room is SW111-30
Faculty is FACL-5

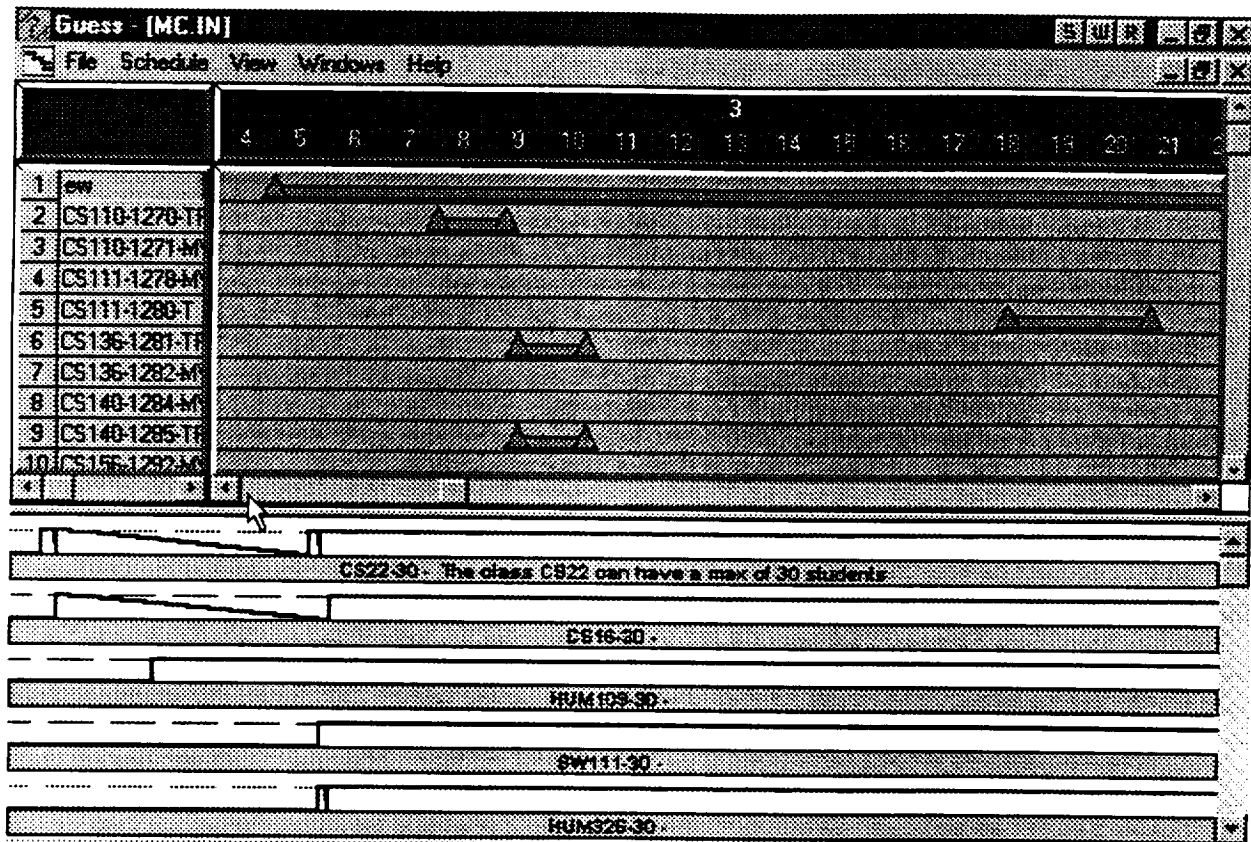
The class CS140-1284-MWF starts on Wed Sep 04 09:00:00 1996
The duration is 50 minutes
Class room is CS22-30
Faculty is FACL-6

The class CS140-1285-TR starts on Tue Sep 03 09:30:00 1996
The duration is 75 minutes
Class room is CS16-30
Faculty is FACL-4

The class CS156-1292-MWF starts on Wed Sep 04 10:00:00 1996
The duration is 50 minutes
Class room is HUM326-30
Faculty is FACL-7

The class CS156-1293-MWF starts on Wed Sep 04 11:00:00 1996
The duration is 50 minutes
Class room is HUM326-30
Faculty is FACL-7

Appendix E-3: Screen Shots of the GUESS Course Scheduling Output



1. Report No. Final Report		2. Government Accession No.		3. Recipient's Catalog No.	
4. Title and Subtitle A Generic Expert Scheduling System Architecture and Toolkit: GUESS				5. Report Date March 31, 1996	
				6. Performing Organization Code	
7. Author(s) Jay Liebowitz, Vijaya Krishnamurthy, Ira Rodens Chapman Houston, Alisa Liebowitz, Seung Baek, Joe Radko, Janet Zeide				8. Performing Organization Report No.	
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9. Performing Organization Name and Address American Minority Engineering Corporation (AMEC) 10422 Armory Avenue, P.O. Box 509 Kensington, Md. 20895				11. Contract or Grant No. NAS5-38062	
				13. Type of Report and Period Covered Final; 4/1/94-3/31/96	
12. Sponsoring Agency Name and Address NASA Goddard Space Flight Center Greenbelt, Maryland 20771				14. Sponsoring Agency Code	
15. Supplementary Notes					
16. Abstract Scheduling has become an increasingly important element in today's society and workplace. Within the NASA environment, scheduling is one of the most frequently performed and challenging functions. Towards meeting NASA's scheduling needs, a research version of a generic expert scheduling system architecture and toolkit has been developed. This final report describes the development and testing of GUESS (Generically Used Expert Scheduling System).					
17. Key Words (Suggested by Author(s)) expert systems, scheduling, generic scheduling systems, intelligent scheduling				18. Distribution Statement Unclassified-Unlimited	
19. Security Classif. (of this report) Unclassified		20. Security Classif. (of this page) Unclassified		21. No. of pages 152	
				22. Price	

